

SS 94-02

PB94-917004  
NTSB/SS-94/02

# NATIONAL TRANSPORTATION SAFETY BOARD

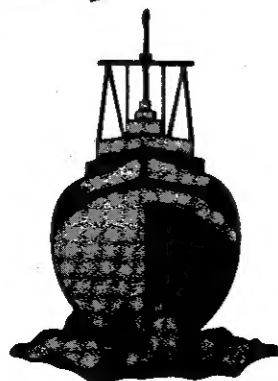
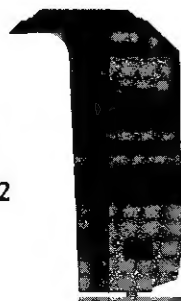
WASHINGTON, D.C. 20594



## SAFETY STUDY

### COMMUTER AIRLINE SAFETY

Doc  
NTSB  
SS  
94/02



6481

# **COMMUTER AIRLINE SAFETY**

## **Safety Study**

Safety Study NTSB/SS-94/02  
Notation 6481

National Transportation  
Safety Board



Washington, D.C.  
November 1994

# Contents

<b>Executive Summary</b> .....	v
<b>Chapter 1: Introduction</b> .....	1
Evolution of Commuter Airlines .....	1
Overview of Differences Between Part 135 and Part 121 .....	4
Flight Operations .....	4
Pilot Training Programs .....	6
Flight Time Limits .....	6
Operational Control .....	6
Maintenance .....	6
Previous Safety Board Studies Concerning Commuter Airline Safety .....	6
The Safety Record of Commuter Airlines .....	8
Purpose of the Study .....	11
<b>Chapter 2: Methodology</b> .....	13
Site Surveys .....	13
Size of the Airline .....	13
Type of Operation .....	14
Geographic Location .....	14
Type of Equipment .....	14
Code-Sharing Arrangement .....	14
Union Representation .....	14
Public Forum .....	15
Examination of Commuter Airline Industry Standards and Practices .....	15
<b>Chapter 3: Flightcrew Scheduling</b> .....	17
Federal Regulations and Commuter Airline Practices .....	
Pertaining to Flight Time and Rest .....	17
Flight Hour Limits and Minimum Rest .....	17
Provisions for Reduced Rest .....	18
Continuous Duty Overnight Scheduling .....	18
Operations Conducted Under Part 91 .....	19
Pilot Responses to Questions About Airline Scheduling Practices .....	19
Initiatives and Other Efforts To Address Flightcrew .....	
Scheduling Standards and Practices .....	21
<b>Chapter 4: Dispatch Services</b> .....	25
Airline and Pilot Responses to Questions About Dispatch Services .....	25
FAA Initiatives To Address Dispatch Services for Part 135 Operations .....	27
<b>Chapter 5: Pilot Training and Qualifications</b> .....	29
Crew Resource Management Training .....	29
Availability and Use of Flight Simulators and .....	
Advanced Training Devices .....	33
Advance Qualification Program .....	37
Contract Training Centers .....	37
Part 142 Training Centers .....	40

Flightcrew Pairing Policies and Practices .....	41
Preemployment Screening and Background Checks .....	45
Action Needed To Address Training Requirements .....	48
<b>Chapter 6: Aircraft Maintenance and Inspection .....</b>	<b>49</b>
<b>Chapter 7: Cabin Safety and Airport Certification .....</b>	<b>53</b>
Crashworthiness and Flammability Standards .....	53
Flight Attendant Scheduling and Training Issues .....	54
Flight Attendant Duty Limits and Rest Requirements .....	54
Hands-On Emergency Training .....	55
Cockpit/Cabin Crew Resource Management Training .....	57
Airport Certification .....	58
<b>Chapter 8: Aircraft Certification and Equipment Requirements .....</b>	<b>61</b>
FAA Activity Concerning Commuter Aircraft	
Certification Standards in 14 CFR Part 23 .....	63
Initiatives Concerning Additional Changes in Part 23	
Certification Standards .....	65
Standardization/Harmonization of Joint Airworthiness	
Authorities and FAA Part 23 Certification Standards .....	65
<b>Chapter 9: Airline Management Oversight .....</b>	<b>67</b>
Management Structure and Oversight Responsibilities .....	69
Overview of Commuter Air Carrier Safety Programs .....	70
Initiatives Taken and Action Needed Concerning	
Air Carrier Safety Programs .....	71
Oversight of Commuter Airlines by Code-Sharing Partners .....	73
<b>Chapter 10: FAA Surveillance .....</b>	<b>77</b>
FAA Air Carrier Surveillance Programs .....	78
Results From the Commuter Airline Survey Regarding	
FAA Surveillance .....	81
Inspector Qualifications and Training .....	82
Staffing Levels and Inspector Workload .....	83
Standardization of FAA Surveillance .....	84
Action Needed To Enhance Surveillance .....	84
<b>Chapter 11: Aligning Regulations With Operating Characteristics .....</b>	<b>87</b>
<b>Findings .....</b>	<b>88</b>
<b>Recommendations .....</b>	<b>91</b>
<b>Appendix .....</b>	<b>95</b>
Survey Questions Asked During Site Visits to Commuter Airlines .....	95

# Executive Summary

The commuter airline industry has grown dramatically and has experienced significant changes in operating characteristics in the past 15 years. In 1993, over 52 million passengers flew on aircraft with 60 or fewer passenger seats. Commuter airlines are increasingly introducing larger, more sophisticated airplanes into their fleets. Additionally, a proliferation of code-sharing arrangements in recent years has given rise to coordinated air service between major air carriers and commuter airlines.

Because commuter airlines evolved from the air taxi segment of the commercial aviation industry, many of the regulatory standards that apply to commuter airline operations differ from those that apply to major air carrier operations. Scheduled passenger service in aircraft containing more than 30 passenger seats is subject to the safety standards in Title 14 CFR Part 121; operations in aircraft containing 30 seats or fewer are subject to the less stringent standards in Part 135.

The National Transportation Safety Board has had a longstanding interest in commuter airline safety and has issued safety recommendations in the past seeking various actions by government and industry to address needed safety improvements. The recommendations followed the Board's 1972 study of air taxi safety, its 1980 study of commuter airline safety, and investigations of accidents involving commuter airline operations. In response to the recommendations and through other initiatives taken by government and industry, regulatory revisions and other actions have resulted in a greatly improved safety record for scheduled Part 135 airlines: the accident rate per 100,000 departures in 1993 was one-fourth the accident rate observed in 1980.

¶However, despite past efforts of government and industry to bring about safety improvements, accident rates for commuter airlines continue to be twice as high as the rates for domestic Part 121 airlines. The higher accident rate demonstrated by commuter airlines, the different regulatory standards in the commercial aviation industry, and findings of the Safety Board's investigations of recent accidents involving commuter airline operations have heightened concerns by government and industry about the safety of the commuter airline industry and the adequacy of Part 135 regulations.¶ These issues and concerns prompted the Safety Board to initiate this study of commuter airline safety. The purpose of the study was to examine the standards and practices of the commuter airline industry, with particular emphasis on areas where changes have occurred since the Board's 1980 study and where regulatory standards differ for Part 135 and Part 121 operations.

The study used data and information from the following sources: (a) onsite interviews conducted in the spring of 1994 with airline management, pilots, flight attendants, and mechanics at 21 commuter airlines; (b) information from a 3-day public forum on commuter airline safety held in June 1994 with participants from government, airlines, trade groups, labor unions, aircraft manufacturers, and training centers; and (c) information from the Safety Board's accident investigations and previous studies on the air taxi/commuter airline industry. The Board examined the current standards and practices of the commuter airline industry relevant to the safety issues and concerns in seven broad areas: flightcrew scheduling and dispatching; flightcrew training and qualifications; aircraft maintenance and inspection; cabin safety and airport certification; aircraft certification and equipment requirements; airline management oversight; and FAA surveillance. The Board also reviewed pertinent Federal regulations, especially where differences occur between the requirements for Part 135 and Part 121 operations, and initiatives being taken to address the issues and concerns.

The safety issues discussed in the study are:

- The need for sweeping regulatory action to address changes in the operating characteristics of the commuter airline industry.
- The adequacy of Part 135 regulations concerning flight time limits and rest requirements.
- The pressures on pilots to accomplish necessary tasks between flights in shorter periods of time without support from licensed dispatch personnel.
- The adequacy of pilot training, including the need for mandatory crew resource management training, the use of contract and simulator training, and operating experience requirements.
- The adequacy of flight attendant training on emergency procedures, and the need for joint crew resource management training for cockpit/cabin crew.
- The need for mandated safety programs at commuter airlines that includes an independent safety function, and for operational oversight by major air carrier code-sharing partners that includes safety audits.

- The training of Federal Aviation Administration inspectors and lack of uniform interpretation and enforcement of regulations by inspectors.
- The certification of airports served by scheduled passenger operations.

As a result of the safety study, recommendations concerning these issues were made to the Federal Aviation Administration, the U.S. Department of Transportation, major U.S. domestic air carriers, and the Regional Airline Association.

## Chapter 1

# Introduction

## Evolution of Commuter Airlines

The origin of commuter airlines can be found in the emergence of the on-demand air taxi industry in the years following World War II. In 1938, the Civil Aeronautics Board (CAB) granted a temporary exemption to all air taxi operators from the economic and safety regulations that applied to scheduled air carriers; the exemption applied to the unscheduled operation of aircraft of 12,500 pounds or less. In 1952, the exemption became permanent in the form of Part 298 of Title 14 of the Code of Federal Regulations (14 CFR Part 298). Air taxi operators, and subsequently commuter airlines, operated under the Part 298 exemption until passage of the Airline Deregulation Act in 1978.

Safety regulation for the air taxi industry was originally accomplished through Civil Aviation Regulation (CAR) 42(a), which was part of the operating regulations established for scheduled air carriers and adapted to the air taxi industry. In 1964, the first permanent safety standards were established for air taxi operators with the adoption of 14 CFR Part 135, "Air Taxi Operators and Commercial Operators," by the Federal Aviation Administration (FAA). Although these standards were less stringent than those in 14 CFR Part 121, "Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft," they introduced an element of stability to the continually developing commuter airline industry.

In 1969, the CAB amended Part 298 to define a "commuter airline" as an air taxi operator that conducted at least five round trip flights per week between two or more points, and published flight schedules that specified the time of the flights, the days of the weeks the flights operated, and the airports between which such flights were conducted.<sup>1</sup> In 1972, Part 298 was amended to allow commuter airlines to operate aircraft with up to 20 passenger seats and a payload capacity of 7,500 pounds or less.

Following passage of the Airline Deregulation Act in 1978, Part 298 was amended again to allow for the operation of aircraft with 60 seats or fewer and a maximum payload capacity of 18,000 pounds. However, under the amendment, aircraft with more than 30 passenger seats were required to operate under the safety

---

<sup>1</sup> An air taxi operator that transported mail under contract to the U.S. Postal Service was also considered to be a commuter air carrier.



standards contained in 14 CFR Part 121, whereas commuter airline operations conducted with 30 or fewer passenger seats continued to be subject to the safety regulations contained in Part 135. These operating requirements remain in effect today. During the mid- to late 1970s, the commuter airline industry continued its growth following economic deregulation of the airline industry. The development of the "hub and spoke" concept by the major carriers created a need for feeder service to major airports, which was accomplished economically by the types of aircraft operated by commuter airlines.

As commuter airlines increasingly moved into markets that were formerly served by major carriers, or created new markets that provided service not previously available, visible differences between commuter airlines and major airlines began to disappear. The advent of inter-airline "code-sharing arrangements" was a distinct factor in the loss of individual carrier identities between commuter airlines and major airlines.<sup>2</sup> Commuter airlines that have a code-sharing arrangement with a major airline typically paint their aircraft with the color scheme of the major airline, and they do business under a company name that closely resembles the major airline, such as "Northwest Airlink," "Delta Connection," "United Express," "American Eagle," and so on. Although these names might imply ownership and control by a major airline, this is not necessarily the case. A code-sharing arrangement may or may not involve some degree of ownership of the commuter airline by its major airline code-sharing partner.

The distinction between commuter and major airline operations previously apparent to the traveling public has been blurred by code-sharing arrangements because of several factors: (1) the close association of some commuter airlines with a major carrier in specific markets; (2) inter-airline agreements between commuter airlines and the major carriers, whereby the major airline will ticket and handle baggage for passengers who connect with commuter flights; (3) integrated listings in the Official Airline Guide; and (4) routine referral of passengers by travel agents and major carriers to affiliated commuter airlines that service small, isolated markets.

As this segment of commercial aviation has continued to grow, Part 298 airlines have become known as regional airlines. Regional airlines may conduct flight operations under Part 135 (which applies to aircraft with 30 or fewer passenger seats) or Part 121 (which applies to aircraft with more than 30 passenger seats), or both, depending on the type(s) of aircraft they operate. The terms "regional" and "commuter" are often used interchangeably. For clarity in the remainder of this report, "commuter" refers to all scheduled passenger service operations conducted under 14 CFR 135.

---

<sup>2</sup> The term "code-sharing" refers to the practice by commuter airlines of using the two-letter designator code of a major airline to list their flights in airline reservations systems.

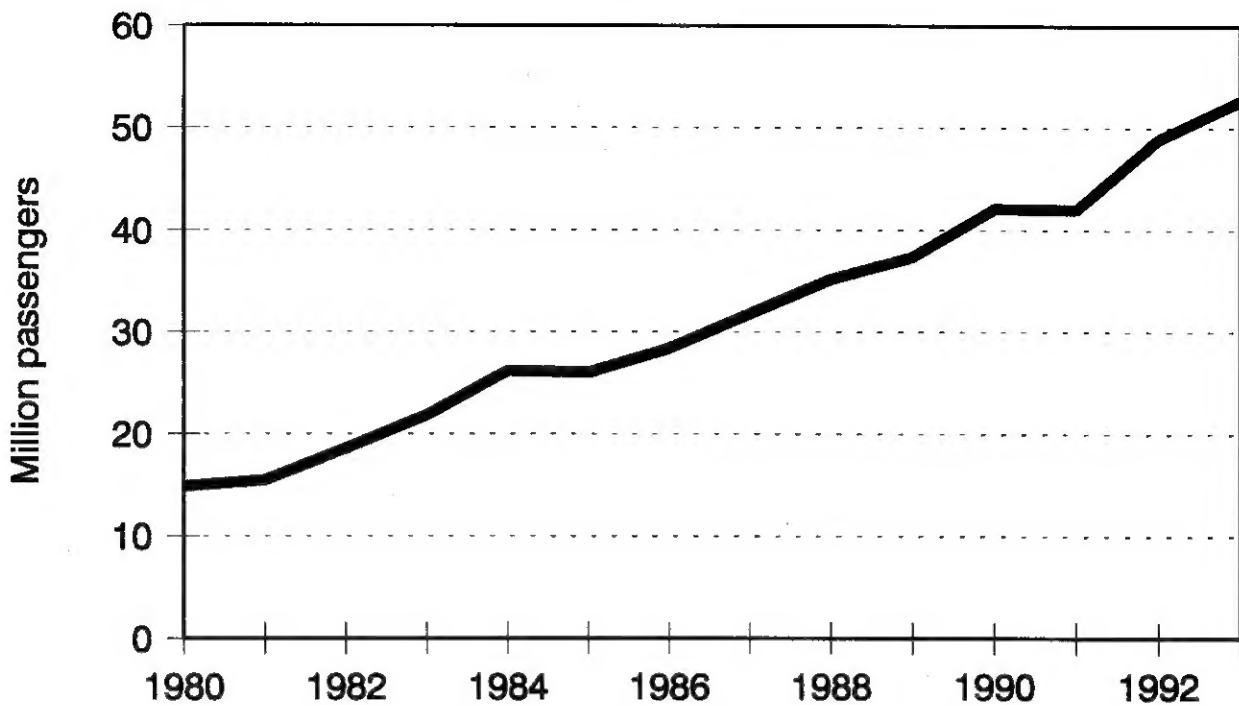


Figure 1.1--Number of passenger enplanements on U.S. regional airlines, 1980 through 1993. (Source: Regional Airline Association. 1994 annual report.)

In the 1980s, the regional airline segment of commercial aviation grew dramatically. Data from the Regional Airline Association (RAA) indicate that in 1980, regional airlines provided service to nearly 15 million passengers.<sup>3</sup> By 1993, the number of passenger enplanements had increased to over 52 million (figure 1.1), and nearly 70 percent of U.S. communities offering scheduled air service depended exclusively on a regional airline as the originating or terminating source of air transportation. Between 1980 and 1993, the number of aircraft in use by the regional airline industry had grown from 1,339 to 2,208.

With continued growth in passenger traffic, regional airlines increasingly have integrated larger, more sophisticated aircraft into their fleets. According to the RAA, as larger aircraft have been introduced, the average seating capacity for regional airlines has increased from 13.9 seats per airplane in 1980 to 23 seats per airplane in 1993. Although regional airlines have steadily added more of the larger capacity, Part 121 aircraft to their fleets in recent years, the largest percentage of their aircraft still contain 10-19 seats, and operations of these aircraft are conducted under Part 135. According to the RAA 1994 annual report, in 1993, 52 percent of the available seat miles in the regional segment of the industry continued to operate under 14 CFR Part 135.

<sup>3</sup> Regional Airline Association. 1994. 1994 annual report. Washington, DC.

The trend toward code-sharing arrangements with major airlines has also continued. In 1993, according to the RAA 1994 annual report, there were 48 code-sharing arrangements between commuter airlines and major airlines, and 36 (72 percent) of the 50 largest commuter airlines had a code-sharing arrangement with at least one major airline.

Although the association with major airlines has been advantageous to the commuter airlines, many passengers are not aware of the regulatory and operational differences between the major and commuter carriers, nor are they aware that many major airlines that have a code-sharing arrangement with a commuter airline may have no direct oversight of flight operations, maintenance, or safety of their code-sharing commuter partner.

Because commuter airlines have evolved differently from the major air carriers, many of the regulatory standards that apply to commuter airline operations differ from those that apply to major air carrier operations. A brief overview of some of the major differences between Part 135 and Part 121 operating standards is presented in the following section.

## **Overview of Differences Between Part 135 and Part 121**

Some of the regulatory differences between Part 121 domestic air carrier operations and Part 135 commuter air carrier operations occur in the areas of flight operations, pilot training programs, flight time limits, operational control, and maintenance. This brief overview is not intended to be a comprehensive treatment of the regulatory differences, and it does not address many of the subtle differences that distinguish these two Parts of the Federal Aviation Regulations. Most of the differences, such as pilot flight time limitations, dispatch, and flight attendant requirements, are discussed in more detail in the appropriate chapters of the report.

***Flight Operations.***—Table 1.1 presents operating requirements for aircraft with different seating capacities. As noted earlier, operations conducted in aircraft with 30 or fewer passenger seats are subject to the requirements in Part 135 (commuter category); operations conducted in aircraft with more than 30 seats are subject to Part 121. Some of the major differences include requirements under Part 121 for licensed dispatch services, flight attendants, and airports certificated under Part 139. Additionally, single-pilot operations are prohibited under Part 121 but not for some Part 135 operations; and there is an upper age limit of 60 years for Part 121 pilots, but no age limit for Part 135 pilots.

**Table 1.1—Federal Aviation Administration operating requirements in Title 14 Code of Federal Regulations for aircraft of different passenger seating capacities that are used in scheduled passenger service**

Operating requirements	Number of passenger seats			
	<10	10-19	20-30	>30
Operations conducted under Part 135	•	•	•	
Operations conducted under Part 121				•
Part 139 certificated airport				•
Two pilots <sup>a</sup>		•	•	•
Flight attendant			•	•
Licensed dispatch personnel				•
Onboard weather radar or thunderstorm detection equipment		•	•	•
Ground proximity warning system (GPWS)		•	•	•
Traffic collision avoidance system (TCAS) <sup>b</sup>		•	•	•
Cockpit voice recorder (CVR)		•	•	•
Flight data recorder (FDR)		• <sup>c</sup>	•	•

Adapted from Regional Airline Association.

<sup>a</sup> Two pilots are not required for visual flight rules (VFR) or limited instrument flight rules (IFR) operations in aircraft with less than 10 passenger seats.

<sup>b</sup> Part 121 operations require TCAS II equipment, which provides resolution advisory (RA) information to pilots. Part 135 operations require only TCAS I equipment, which provides traffic alerts but does not provide RA information to pilots.

<sup>c</sup> A flight data recorder (FDR) is required on aircraft with 10-19 passenger seats that were manufactured after October 11, 1991.

Within Part 135, many operating requirements vary by the number of passenger seats in the aircraft. For example, Part 135 operations on aircraft with 20-30 passenger seats are required to have a flight attendant on board.

**Pilot Training Programs.**—Part 121 requires that pilot training programs include a programmed number of hours for ground, flight, and recurrent training. Under Part 135, training program hours are not specified; pilots are trained to proficiency, which means that the only requirement is for successful completion of the applicable test or check flight. Appendix H of Part 121 allows for the conduct of pilot training in flight simulators; no such counterpart exists in Part 135, although simulator training may be conducted through an exemption granted by the FAA.

**Flight Time Limits.**—Pilots are limited in the number of hours of flight time they may accrue in revenue operations in any given week, month, and year. The flight time limits are somewhat less stringent for Part 135 operations than for Part 121 operations.

**Operational Control.**—Part 121 flights operate under the joint authority of the pilot-in-command and a licensed dispatcher who maintains constant contact with the aircraft while it is en route. Part 135 requires only that the airline have procedures for locating the aircraft and for notifying the FAA or rescue personnel if an aircraft is overdue or missing.

**Maintenance.**—The maintenance requirements under Parts 121 and 135 are similar, with only a couple of differences. A chief inspector is a required management position under Part 121 but not under Part 135. Further, a duty time limitation for Part 121 maintenance personnel requires 24 consecutive hours off duty during any 7 consecutive days of duty. There are no duty limits for maintenance personnel under Part 135.

## Previous Safety Board Studies Concerning Commuter Airline Safety

Since its establishment in 1967, the National Transportation Safety Board has monitored the safety status of the commuter airline industry through accident investigations and special studies. In the 1960s, there was little difference in the nature of "scheduled commuter airlines" and "on-demand air taxi" companies, and the Safety Board's early investigations and safety recommendations reflected this lack of differentiation.

A series of air taxi accidents in the late 1960s prompted the Safety Board to conduct a special study of the air taxi/commuter airline industry to examine the differences in operations of the on-demand air taxi operators and the commuter

airlines, and the ability of Part 135 regulations to provide an adequate level of safety.<sup>4</sup> The report noted the wide variability in the size and types of operations conducted under Part 135, and made special mention of the rapid growth of the commuter air carrier segment of the industry. The study resulted in 27 safety recommendations to the FAA, the CAB, and the U.S. Postal Service. The Safety Board's concern about the inability of existing regulatory programs to assure adequate levels of operational safety was addressed in one of the recommendations, which asked the FAA to take the following action:

Expedite redrafting of 14 CFR 135 in its entirety, recognizing that commuter air carrier operators are separate entities from the smaller air taxi charter operators. (A-72-171)

Following regulatory action taken by the FAA, the Safety Board classified the recommendation "Closed—Acceptable Action" on July 2, 1979.

In 1980, the Safety Board conducted a special study of the commuter airline industry, partly because of a series of commuter accidents that occurred between 1972 and 1979.<sup>5</sup> The Safety Board held a 4-day public hearing on commuter airline safety as part of the study effort. The study reported 46 findings identifying problem areas that either contributed to or could potentially compromise safety, and resulted in 17 recommendations to the FAA concerning FAA oversight, pilot training and qualification standards, flight recorder standards, and airport facilities. Four safety recommendations encouraged the FAA to improve its surveillance and inspections of Part 135 operations.<sup>6</sup> The objective of the recommendations was to "convince the FAA to implement a program of enhanced surveillance and enforcement for Part 135 operators," with particular emphasis on commuter airline operations. The objective was selected because the problem, which was of national significance, had not been addressed promptly, even though needed improvements were known, feasible, and could be implemented in a timely manner. The Safety Board study also identified deficiencies in pilot training, aircraft maintenance, aircraft crashworthiness standards, oversight of flight and company operations by airline management, and oversight and surveillance of commuter airlines by the FAA.

Since completion of the 1972 and 1980 studies, the Safety Board has continued to focus attention on commuter airline safety because of the continued evolution and growth of the industry, and because of the recurrent identification of safety deficiencies found during accident investigations.

---

<sup>4</sup> National Transportation Safety Board. 1972. Air taxi safety study. Special Study NTSB/AAS-72/9. Washington, DC.

<sup>5</sup> National Transportation Safety Board. 1980. Commuter airline safety, 1970-1979. Special Study NTSB/AAS-80/1. Washington, DC.

<sup>6</sup> The specific recommendations are discussed in chapter 10, "FAA Surveillance."

## The Safety Record of Commuter Airlines

The combined efforts of government and industry in the 14 years since the Safety Board's last study have resulted in a greatly improved safety record for scheduled Part 135 airlines. As figure 1.2 illustrates, the accident rate per 100,000 departures in 1993 was one-fourth the accident rate observed in 1980. However, the dramatic reduction in the accident rate that occurred from 1980 to 1983 appears to have leveled off since 1983, with only minor year-to-year variability.

During an 8-month period in the mid-1980s, 25 persons were killed in three separate accidents involving scheduled flights of commuter airlines. The first occurred in August 1985, when eight persons were fatally injured in the crash of a Bar Harbor Airlines Beech 99 near Auburn, Maine.<sup>7</sup> A few weeks later, a Henson Airlines Beech 99 crashed on approach to the Shenandoah Valley Airport near Grottoes, Virginia, resulting in 14 fatalities.<sup>8</sup> The third accident occurred several months later when an Embraer EMB-110, operated by Simmons Airlines, crashed near Alpena, Michigan, resulting in three fatalities.<sup>9</sup>

In 1986, as a direct result of these three accidents, the Safety Board issued 21 safety recommendations to the FAA and the RAA that addressed pilot qualifications and training, the approval of training simulators, instrument approach procedures, aircraft equipment, and FAA surveillance. In response to the recommendations, the FAA initiated several safety improvements, including a requirement for the installation of an approved Ground Proximity Warning System (GPWS) on all turbine-powered, fixed-wing aircraft with a seating capacity of more than 9 seats. The requirement for GPWS became effective in 1994.

Despite past efforts of government and industry to bring about safety improvements, accident rates for commuter airlines continue to be twice as high as the rates for domestic Part 121 airlines. The Safety Board recognizes that certain factors may contribute to the higher accident rate for commuter airlines. Commuter flights generally operate at lower altitudes and thus cannot always evade severe weather by flying over it. Further, facilities at many airports served by commuter airlines do not have sophisticated landing aids or are not as well-maintained as large

---

<sup>7</sup> National Transportation Safety Board. 1986. Bar Harbor Airlines flight 1808, Beech BE-99, N300WP, Auburn-Lewiston Municipal Airport, Auburn, Maine, August 15, 1985. Aircraft Accident Report NTSB/AAR-86/06. Washington, DC.

<sup>8</sup> National Transportation Safety Board. 1986. Henson Airlines flight 1517, Beech B99, N339HA, Grottoes, Virginia, September 23, 1985. Aircraft Accident Report NTSB/AAR-86/07. Washington, DC.

<sup>9</sup> National Transportation Safety Board. 1987. Simmons Airlines, flight 1746, Embraer Bandeirante, EMB-110P1, near Alpena, Michigan, March 13, 1986. Aircraft Accident Report NTSB/AAR-87/02. Washington, DC.



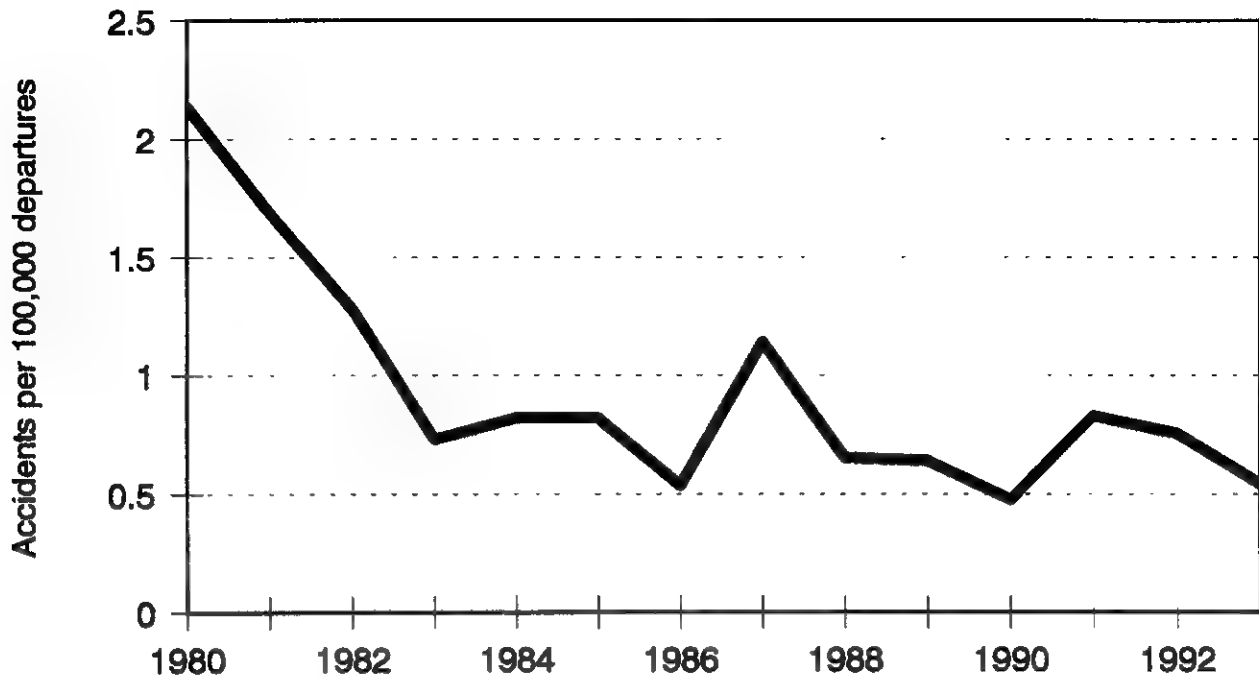


Figure 1.2--Accident rates of scheduled commuter airline flights operating under 14 CFR Part 135, 1980 through 1993. (Source: National Transportation Safety Board.)

airports served by major airlines. Nevertheless, the Board believes that additional safety improvements can be made that would have a positive impact on the safety record of commuter airlines.

Recent accidents have highlighted the need for additional safety improvements in areas such as pilot training and experience, flightcrew coordination, maintenance and inspection, airline management oversight, and FAA surveillance. In a 26-month period from December 1991 to January 1994, there were 14 fatal accidents involving scheduled commuter flights and commuter airline training flights; 56 persons were killed. Several of the accidents involved important safety issues that had been addressed previously by the Safety Board: pilot situational awareness, pilot experience and training, crew pairing, company oversight, and FAA oversight. Some examples are provided below:

In December 1991, a Beech 1900C, operated by Business Express Airlines, crashed in the Atlantic Ocean during a training flight. The Safety Board cited the company's lack of involvement in and oversight of its training program as one of the causes of the accident.<sup>10</sup> In 1993, the pilots of a Beechcraft C-99, operated by GP

<sup>10</sup> National Transportation Safety Board. 1993. Loss of control, Business Express, Inc., Beechcraft 1900C, N811BE, near Block Island, Rhode Island, December 28, 1991. Aircraft Accident/Incident Summary Report NTSB/AAR-93/01/SUM. Washington, DC.



Express Airlines, attempted an aerobatic maneuver during a check ride at night.<sup>11</sup> The Safety Board found company management's oversight of its training operations to be inadequate.

In January 1992, the Safety Board investigated an accident involving a Beech 1900C operated by Commutair on a scheduled passenger flight near Gabriels, New York.<sup>12</sup> Factors in the accident included the captain's failure to establish a stabilized approach with a steeper-than-normal descent rate below the minimum descent altitude, and the first officer's failure to monitor the approach.

On June 8, 1992, a Beechcraft C-99, operated by GP Express, crashed while approaching the metropolitan airport in Anniston, Alabama.<sup>13</sup> The Safety Board investigation found that the accident occurred on the captain's first day as pilot-in-command for the company, and that he was hired as a captain with virtually no experience in commuter operations. The first officer also had little experience in the aircraft type. The Safety Board cited the company's failure to provide adequate training and operational support to the pilots as contributing to the accident.

On December 1, 1993, a Jetstream BA-3100 operated by Express II Airlines (as Northwest Airlink) crashed during an unstabilized, localizer back course approach in instrument meteorological conditions at Hibbing, Minnesota.<sup>14</sup> The captain's failure to follow standard operating procedures in his decision to use an excessive descent rate during the approach was cited by the Safety Board as a major factor in the accident.

This accident was followed 1 month later by the crash of a Jetstream 4101 operated by Atlantic Coast Airlines (as United Express) that stalled while executing an instrument landing system approach to the Port Columbus Airport in Columbus, Ohio.<sup>15</sup> The Safety Board found that the flightcrew flew an unstabilized approach, failed to monitor airspeed, improperly responded to the stall warning, and allowed the airplane to stall: all failures of basic airmanship that the Safety Board

---

<sup>11</sup> National Transportation Safety Board. 1994. Controlled flight into terrain, GP Express Airlines, Inc., N115GP, Beechcraft C-99, Shelton, Nebraska, April 28, 1993. Aircraft Accident/Incident Summary Report NTSB/AAR-94/01/SUM. Washington, DC.

<sup>12</sup> National Transportation Safety Board. Brief of Accident No. 1046.

<sup>13</sup> National Transportation Safety Board. 1993. Controlled collision with terrain, GP Express Airlines, Inc., flight 861, a Beechcraft C99, N118GP, Anniston, Alabama, June 8, 1992. Aircraft Accident Report NTSB/AAR-93/03. Washington, DC.

<sup>14</sup> National Transportation Safety Board. 1994. Controlled collision with terrain, Express II Airlines, Inc./Northwest Airlink flight 5719, Jetstream BA-3100, N334PX, Hibbing, Minnesota, December 1, 1993. Aircraft Accident Report NTSB/AAR-94/05. Washington, DC.

<sup>15</sup> National Transportation Safety Board. 1994. Atlantic Coast Airlines d/b/a United Express, flight 6291, BAe Jetstream 4101, N304UE, Columbus, Ohio, January 7, 1994. Aircraft Accident Report NTSB/AAR-94/07. Washington, DC.

determined were causes of the crash. The Safety Board also cited the relative inexperience of both pilots in aircraft type and crew position; the company's failure to provide adequate stabilized approach criteria, and the FAA's failure to require such criteria; the company's failure to provide adequate crew resource management (CRM) training, and the FAA's failure to require such training; and the unavailability of suitable training simulators for the Jetstream 4101 as causal or contributing to the accident.

## **Purpose of the Study**

The public's lack of awareness about the different regulatory standards in the commercial aviation industry, the consistently higher accident rate demonstrated by commuter airlines, and recent accidents involving commuter airline flights have raised concerns by government and industry about the safety of the commuter airline industry and the adequacy of the regulations that govern commuter airlines. A portion of the industry believes that, given the changes and growth observed in this segment of the airline industry over the past 14 years, commuter airlines should be governed by the same regulations that apply to major airlines. These issues and concerns prompted the Safety Board to initiate a safety study of the commuter airline industry in February 1994. The purpose of the study was to examine the standards and practices of the commuter airline industry, with particular emphasis on areas where differences occur between the regulatory standards for Part 135 and Part 121 operations.

Chapter 2 of this report describes study methods, and chapters 3 through 10 discuss safety issues concerning flightcrew qualifications and training, flightcrew scheduling, dispatching, aircraft maintenance and inspection, cabin safety and airport certification, aircraft certification and equipment requirements, airline management oversight, and FAA surveillance. Chapter 11 presents the Safety Board's position on revising the Federal Aviation Regulations to enhance the safety of commuter airline operations. The last sections present the Safety Board's findings and safety recommendations made as a result of this study.

## Chapter 2

# Methodology

This study draws on the Safety Board's knowledge and experience gained from accident investigations and past studies. To gain further knowledge about standards and practices in the commuter airline industry, the Safety Board reviewed information obtained through two additional sources: (1) a site survey of airline operations and policies conducted at a representative sample of commuter airlines; and (2) a public forum on commuter airline safety convened by the Safety Board.

The Safety Board limited the scope of the study to airlines that offered scheduled passenger service using fixed-wing aircraft operated under 14 CFR Part 135. Given the unique characteristics of the operating environment in Alaska, a decision was made to exclude from the site survey airlines that operate primarily in Alaska.<sup>16</sup> However, the Safety Board emphasizes that the issues of concern with regard to scheduled Part 135 operations, and findings from the information obtained in the course of this safety study, apply to operations in Alaska as well as the other 49 States and U.S. Territories. Also excluded from the sample were airlines that had a major accident under investigation at the time of the study, or had recently experienced a major accident that had been investigated and reported on by the Safety Board.

## Site Surveys

Information on commuter airline operations was obtained through structured interviews conducted between April and June 1994 during site visits to a sample of commuter airlines. In selecting the sample of airlines to visit, an attempt was made to include airlines that represent the range of operations in the commuter airline industry considering size of the airline, type of operation(s) conducted (under Part 135 only, or under Parts 135 and 121), geographic location, type(s) of equipment, whether or not the airline has a code-sharing arrangement with a major airline, and whether or not the pilots have union representation. Based on these factors, a sample of 21 airlines was selected for site visits.

***Size of the Airline.***—Size of the airline was measured by the total number of passenger enplanements during 1993, as reported in the RAA's 1994 annual report

---

<sup>16</sup> Commercial aviation operations in Alaska will be the focus of a special investigation that is being developed by the Safety Board staff.

or as reported to Safety Board staff during site visits to the airlines.<sup>17</sup> The number of 1993 passenger enplanements reported by each of the 21 airlines that participated in the site surveys ranged from 22,951 to 4,177,648.<sup>18</sup> The total number of enplanements during 1993 for all 21 airlines was 22,029,253 passengers, which represents 42 percent of all passengers carried by commuter and regional airlines in 1993.<sup>19</sup> Also, 15 of the 21 airlines in the Safety Board's sample were among the 50 largest commuter and regional airlines, as reported in the RAA's 1994 annual report.

**Type of Operation.**—The sample included airlines that operate scheduled service under Parts 121 and 135, as well as airlines that operate scheduled service exclusively under Part 135. Of the 21 airlines, 12 (57 percent) provide scheduled passenger service exclusively under Part 135; 9 airlines provide scheduled passenger service under Part 121 and scheduled Part 135.

**Geographic Location.**—The corporate headquarters for the 21 airlines in the sample are located in 16 States. At least one airline is located in each of the 8 FAA regions that comprise Hawaii and the contiguous 48 States. No airlines located in Hawaii, Alaska, or Puerto Rico were included in the sample.

**Type of Equipment.**—The types of airplanes operated by airlines in the sample varied from the 8-seat Piper PA-31 to the 50-seat Canadair RJ turbojet.

**Code-Sharing Arrangement.**—Of the 21 airlines in the sample, 14 (67 percent) reported that they have a code-sharing arrangement with at least one major airline. Of those 14 airlines, 4 are fully owned by a major code-sharing partner, 3 are partially owned, and 7 have no ownership by a major airline.

**Union Representation.**—Ten (48 percent) of the 21 airlines reported that their pilots have union representation.

Once the sample of airlines was selected, each airline was contacted and invited to participate voluntarily in the study. Site visits at each airline were conducted by at least two Safety Board staff members who typically spent 2 days at the company. Airlines were informed in advance of the nature of the information that would be requested and were asked to make available the management personnel who would best be able to provide that information. At most airlines,

---

<sup>17</sup> Enplanement figures given in this section represent all passenger enplanements for the year (including those from the airlines' scheduled Part 121 operations), not just the enplanements from scheduled Part 135 operations.

<sup>18</sup> One participating airline began operations during 1993, so its reported enplanements do not include all of 1993.

<sup>19</sup> "Regional" refers to airlines predominantly comprising aircraft fleets with 60 seats or fewer. Some of these airlines operate exclusively under Part 121. However, information on commuter airlines is often combined with information on regional airlines when reporting statistics such as passenger enplanements.

Safety Board staff interviewed upper and middle management personnel (for example, director of operations, chief pilot, director of maintenance). In addition, Safety Board staff conducted structured interviews with pilots, flight attendants, and maintenance personnel at several of the airlines.<sup>20</sup>

## Public Forum

A public forum on commuter airline safety was held on June 14, 15, and 16, 1994, in Atlanta, Georgia.<sup>21</sup> Thirty seven representatives from government, industry, airlines, trade groups, labor unions, aircraft manufacturers, and training centers participated in seven panel sessions convened to discuss issues and concerns in the following broad areas: (1) flightcrew scheduling and dispatching; (2) flightcrew training and qualifications; (3) aircraft maintenance and inspection; (4) cabin safety; (5) aircraft certification and design; (6) management oversight and safety programs; and (7) FAA surveillance and oversight.

Participants in the public forum were asked to submit written material pertinent to one or more of the areas being examined as part of the safety study and to submit the material to the Safety Board in advance of the proceedings. At the beginning of each panel session, each industry representative presented a brief oral summary of previously submitted material that was pertinent to the topic. After all members of the panel completed their oral presentations, the panel representatives engaged in open discussion of the issues raised in the oral summaries or through questions posed by the Board of Inquiry.

## Examination of Commuter Airline Industry Standards and Practices

Using the results of the commuter airline survey, transcript of the public forum, and information from the its previous studies and accident investigations, the Safety Board examined the current standards and practices of the commuter airline industry relevant to the safety issues and concerns in the seven broad areas identified in the preceding section. The Safety Board also reviewed pertinent Federal regulations, especially where differences occur between the requirements for Part 135

---

<sup>20</sup> Interview questions asked during the site surveys are contained in the appendix.

<sup>21</sup> The proceedings were overseen by a Board of Inquiry comprising Safety Board senior management and staff. The Board of Inquiry was lead by one Member of the Safety Board. The proceedings were recorded.

and Part 121 operations, and initiatives being taken to address the issues. This report presents the results of the examination and identifies areas where further action is needed to increase the level of safety in the commuter airline industry.

## Chapter 3

# Flightcrew Scheduling

## Federal Regulations and Commuter Airline Practices Pertaining to Flight Time and Rest

Federal regulations pertaining to crew flight time limitations and rest requirements have been a source of widespread concern for many years. In 1979, the Safety Board reviewed the regulations in terms of their adequacy to provide sufficient periods of rest to flightcrews operating under Part 135.<sup>22</sup> As a result of the review, the Board asked the FAA to "...make the flight and duty time limitations for commuter air carriers the same as those specified for domestic carrier crewmembers under 14 CFR 121" (Safety Recommendation A-79-81). The Safety Board reiterated the recommendation in its 1980 study on commuter airline safety.

In response to the recommendation, the FAA issued a Notice of Proposed Rulemaking (NPRM) in 1980 to revise flight and duty time limitations and rest requirements to the same standards for both 14 CFR Part 135 and Part 121. Following public comment on the proposed rulemaking, the NPRM was withdrawn by the FAA in 1981. As a result of the withdrawal, the Board classified Safety Recommendation A-79-81 "Closed—Unacceptable Action."

In 1985, the FAA amended the flight time limitations and rest requirements under Part 135 to the current standards. Amendment 135-19 established different flight time and rest regulations for scheduled and for unscheduled Part 135 operations; established weekly, monthly, and annual flight time limitations for all operations conducted under Part 135; and included provisions for reduced rest periods and compensatory rest periods.

***Flight Hour Limits and Minimum Rest.***—Current regulations contained in Parts 135 and 121 establish maximum limits on flight hours over specified time periods. Pilots flying scheduled operations under Part 135 are limited to 34 hours per week, 120 hours per month, and 1,200 hours per year, whereas pilots flying domestic operations under Part 121 are limited to 30 hours per week, 100 hours per month,

---

<sup>22</sup> The review was conducted during the investigation of a commuter airline accident. (National Transportation Safety Board. 1979. Universal Airways, Inc., Beech 70, Excaliber conversion, N777AE, Gulfport, Mississippi, March 1, 1979. Aircraft Accident Report NTSB/AAR-79/16. Washington, DC.)

and 1,000 hours per year. The regulations governing minimum rest for pilots are the same for Part 135 and Part 121 operations.

**Provisions for Reduced Rest.**—One of the regulatory changes that occurred with Amendment 135-19 was a set of allowances for providing less than the required rest period for pilots in exchange for compensatory rest later (14 CFR 135.265c). Under these provisions, a Part 135 air carrier may reduce a pilot's required rest period to as little as 8 hours in a 24-hour period in exchange for an extended rest period later. Reduced rest periods are also allowed under Part 121. The requirements contained in Parts 135 and 121 for minimum rest periods and allowable reductions in rest periods are as follows:

<u>If the scheduled flight time is:</u>	<u>The minimum rest period in the 24 hours before duty is:</u>	<u>Which may be reduced to:</u>	<u>If the rest period following duty is increased to:</u>
< 8 hours	9 hours	8 hours	10 hours
8-9 hours	10 hours	8 hours	11 hours
≥ 9 hours	11 hours	9 hours	12 hours

The intent of the reduced rest provisions was to provide carriers more flexibility with flightcrew schedules to accommodate extended duty days that result from unforeseen operational delays. However, the current reduced rest provisions allow carriers to establish schedules that result in reduced rest, and many airlines routinely take advantage of the provisions when scheduling their flightcrews rather than using the provisions for unforeseen circumstances, as originally intended. In the Safety Board's commuter airline survey, officials from 9 of 20 responding airlines (45 percent) reported that, as a matter of company scheduling policy, they use the reduced rest provisions for determining flightcrew schedules. During discussions on the regulations at the 1994 public forum, the vice president of operations at one large commuter airline reported that his company uses the reduced rest provisions to schedule flights. He further indicated that the reduced rest schedules were among the most popular schedules among pilots because the reduced rest schedules compress a pilot's duty time into a shorter time frame, allowing longer periods of time off duty.

**Continuous Duty Overnight Scheduling.**—A flightcrew scheduled for "continuous duty overnight" flies one or more evening flights, spends the night at the destination, and then flies one or more flights the next morning. Because the amount of time spent at the overnight destination is less than the required rest period, the pilots remain on duty during the overnight period. There is no Federal requirement for carriers to provide a hotel room or rest facility for pilots on duty overnight; consequently, flightcrews could be scheduled for an extended duty day that contains a considerable period of inactivity but with no guarantee of an opportunity for comfortable rest during the period of inactivity. Of the 21 carriers that participated in the Safety Board's commuter airline survey, 9 (43 percent) indicated that they



schedule crews for continuous duty overnight. However, all 9 stated that they do provide hotel rooms for pilots to use overnight.

***Operations Conducted Under Part 91.***—It is common practice for commuter airlines to conduct nonrevenue operations—such as flight training and check rides, ferry flights and repositioning flights—under the less restrictive regulations contained in 14 CFR Part 91.<sup>23</sup> One advantage of doing so is that the restrictions on pilot flight times which apply to operations conducted under Part 135 do not apply to flights operated under Part 91. Consequently, pilots who have completed a full day of revenue flying and have reached the maximum limit of flight hours under Part 135 may still be scheduled for training flights and other nonrevenue flights, which are conducted under Part 91, at the end of the day.

Participants in the commuter airline survey were asked if the company had established any policies about duty or flight time restrictions, more stringent than the Federal regulations, when scheduling training flights or check rides. Of the 19 who responded, 6 indicated that their company did have scheduling policies more stringent than the regulations. Two of the six reported that they have contractual (pilot union) limitations on duty limits when training is scheduled (8 hours in one case; 12 hours in the other); two others indicated that pilots are notified a month in advance of their training schedule; and the remaining two reported that pilots are removed from the flight schedule for an unspecified amount of time before and after training. The remaining 13 airlines observe only the Federal regulations when scheduling training flights or check rides.

## **Pilot Responses to Questions About Airline Scheduling Practices**

Issues related to flight time and rest, particularly in areas of flightcrew scheduling and pilots' self-reports of fatigue, were examined during the site visits to commuter airlines by the Safety Board staff.<sup>24</sup> In the pilot surveys taken during the site visits, pilots were asked several questions about airline scheduling policies and practices, commuting to crew domiciles, and other jobs that they held.

---

<sup>23</sup> Regulations in Part 91 apply to the general (noncommercial) operation of civil aircraft.

<sup>24</sup> The evidence in this report for pilots flying while fatigued is based entirely on pilots' self-reports, which are subjective assessments of fatigue. It was beyond the scope of this study to attempt to objectively measure pilot fatigue or to verify particular instances of pilots flying while fatigued. Thus, the Safety Board believes that caution should be used in interpreting the results pertaining to pilots flying while fatigued.

**Table 3.1—Aspects of flightcrew scheduling that resulted in pilots' self-reports of flying while fatigued<sup>a</sup>**

Aspect of flightcrew scheduling	Has the aspect of crew scheduling caused you to fly while fatigued?	
	Yes	No
Number of days worked per month	12	40
Number of flight hours flown per month	10	42
Flying late at night	26	26
Early shift followed by a late shift	38	14
Continuous duty overnight	25	27
Length of duty day	45	7
Length of rest period	37	15
Reserve duty	22	30
Junior-manning	8	44
Unscheduled flight delays	41	11
Rescheduling, including addition of more flights to the duty day	25	27

<sup>a</sup> The responses shown in this table are from the 52 pilots who indicated in the National Transportation Safety Board 1994 commuter airline survey that they had flown while fatigued. Another 8 pilots indicated that they had never flown while fatigued.

One survey question presented pilots with several aspects of crew scheduling that might cause a pilot to fly while fatigued. Each pilot was asked to indicate if he or she had ever flown while fatigued and, if so, to indicate which scheduling aspect(s) had been the cause. Of the 60 pilots who responded to the question, only 8 (13 percent) indicated that they had not flown while fatigued. The remaining 52 pilots (87 percent) identified the aspects of scheduling that had resulted in their flying while fatigued. The most frequently cited aspects were length of duty day, unscheduled flight delays, an early shift followed by a late shift, and length of rest period (table 3.1). Pilots who cited length of duty day reported that it was common to be on duty 14 to 16 hours each day, particularly when weather or mechanical delays occurred.

Pilots were also asked whether or not they had ever wanted to decline or terminate a duty shift, training, or a check ride for reasons of fatigue. Of the 61 pilots who responded with regard to duty shift, 38 (62 percent) indicated that they had wanted to decline or terminate it; however, only 15 (25 percent) had actually done so. With regard to training, 17 (28 percent) of the 60 pilots who responded stated that they had wanted to decline or terminate it because of fatigue; however, only 5 (8 percent) had done so. With regard to a check ride, 7 (12 percent) of the 59 who responded had wanted to decline or terminate it; only 1 (2 percent) of those pilots actually did cancel a check ride because of fatigue.

As a followup to the survey question, the pilots were asked if they knew the company's policy on declining or terminating duty for reasons of fatigue. Most pilots responded that they did not believe they would have any problems with the company if they needed to terminate or decline duty or training because of fatigue, and the majority of those who actually did decline duty or training, as well as the pilot who canceled a check ride because of fatigue, reported no negative repercussions from management. However, some pilots did believe the company would "hassle" them if they declined duty or training because of fatigue. Also, the survey results suggest that, aside from management pressure, a company's pay policy could affect a pilot's decision about whether or not to fly fatigued. The pilots from one airline, who are paid by the number of miles flown, reported that they would not cancel a trip due to fatigue because that would mean they would not be paid.)

## **Initiatives and Other Efforts To Address Flightcrew Scheduling Standards and Practices**

In 1992, the Safety Board addressed the practice of scheduling reduced flightcrew rest periods following its investigation of a commuter aircraft accident in Brunswick, Georgia.<sup>25</sup> In Safety Recommendation A-92-28, the Board asked the FAA to:

Issue an Air Carrier Operations Bulletin (ACOB) directing Principal Operations Inspectors to clarify with their operators that the intent of 14 CFR Section 135.265 is not to routinely schedule reduced rest, but to allow for unexpected operational delays, and to require compliance with the intent of the regulation.

---

<sup>25</sup> National Transportation Safety Board. 1992. Atlantic Southeast Airlines, Inc., flight 2311, uncontrolled collision with terrain; an Embraer EMB-120, N270AS, Brunswick, Georgia, April 5, 1991. Aircraft Accident Report NTSB/AAR-92/03. Washington, DC.

In its 1992 response to the recommendation, the FAA indicated that it would present the issue of reduced rest to an Aviation Rulemaking Advisory Committee (ARAC) on flightcrew scheduling standards and practices.<sup>26</sup> On October 6, 1992, the Safety Board classified Safety Recommendation A-92-28 "Open—Acceptable Response," pending the ARAC's recommendations on regulatory revisions.

In the Safety Board's opinion, rest should be defined as time available for restful sleep, and minimum rest periods should provide the opportunity for adequate sleep, taking into account time needed for travel to and from rest facilities and for attending to nourishment and personal hygiene. Because of its concern regarding this issue, the Board was interested in the revisions that might be proposed by the ARAC.

The FAA convened the ARAC in 1992 in response to industry concerns about flight and rest issues, and the group submitted its final report to the FAA Administrator in June 1994. Although the report has not been released by the FAA, comments made by ARAC members during the 1994 public forum suggest that the ARAC was unable to reach consensus on key issues necessary for regulatory revisions. The Safety Board is disappointed that important issues concerning flightcrew scheduling and rest remain unresolved after 2 years, despite the efforts of the ARAC; accordingly, the Board reclassifies Safety Recommendation A-92-28 "Open—Unacceptable Response."

With regard to flight time limitations, the Safety Board recognizes that carriers must conduct many of their nonrevenue operations at night when company airplanes are not being used for revenue operations. (Nevertheless, the practice of scheduling pilots for training, check flights, and other company flight duties at the end of a full day of scheduled revenue flying increases the potential for fatigue-related accidents and raises questions about the effectiveness of training conducted in such a learning environment. Scheduling allowances should be made to provide pilots with an adequate opportunity for rest before they perform nonrevenue flight duties.)

The air carrier practice of assigning Part 121 flightcrews to company flights conducted under Part 91 at the end of commercial operations was addressed in the Safety Board's investigation of a recent accident involving a DC-8-61 freighter operating under regulations contained in 14 CFR Part 121, Supplemental Air Carrier.<sup>27</sup> The investigation revealed that the crew had been legally on duty for

---

<sup>26</sup> An ARAC is a group of industry and government representatives convened by the FAA to facilitate the FAA's rulemaking process. The group is charged with examining issues pertinent to a particular area of concern and developing recommendations for advisory material and/or revisions to current regulations. In addition to the ARAC on flightcrew scheduling, the FAA has also convened ARACs on other topics addressed in this report; activities of those ARACs are discussed in chapters that follow.

<sup>27</sup> National Transportation Safety Board. 1994. Uncontrolled collision with terrain, American International Airways flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993. Aircraft Accident Report NTSB/AAR-94/04. Washington, DC.

about 18 hours (with 9 hours of flight time) when the accident occurred, and was scheduled to ferry the airplane to Atlanta, Georgia, after the airplane was offloaded in Guantanamo Bay, which would have resulted in a total duty time of about 24 hours. In its letter of May 18, 1994, the Safety Board asked the FAA to:

Revise the Part 121 regulations such that flight time accrued in noncommercial "tail end" ferry flight conducted under 14 CFR Part 91, as a result of 14 CFR Part 121 revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations. (A-94-105)

In its response letter of July 13, 1994, the FAA indicated that it was considering an NPRM to address the recommended action. Consequently, the Safety Board classified Safety Recommendation A-94-105 "Open—Acceptable Response" on August 11, 1994.

( Likewise, the Safety Board believes that the FAA should revise the Federal Aviation Regulations contained in 14 CFR Part 135 to require that flight time accumulated in all company flying conducted after revenue operations—such as training and check flights, ferry flights and repositioning flights—be included in the crewmember's total flight time accrued during revenue operations.)

During the public forum discussion, consensus was reached among panel members that any revisions to the current flightcrew duty and rest regulations should be based on objective, empirical support, not through "negotiation," which has been the approach taken in the past. The Safety Board agrees with the panel's position and has recently urged a systematic review of the regulations pertaining to flight and duty limitations that incorporates the current level of scientific knowledge of fatigue and its effects on performance. In its investigation of the Guantanamo Bay accident, the Safety Board cited "...the impaired judgment, decisionmaking, and flying abilities of the captain and flightcrew due to the effects of fatigue..." as a causal factor in the accident. As a result, the Board issued the following recommendation to the FAA:

Expedite the review and upgrade of Flight/Duty Time Limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues. (A-94-106)

In its initial response to this recommendation on July 13, 1994, the FAA indicated that it was considering the issuance of an NPRM to address flightcrew duty limits and rest requirements. The Safety Board classified this recommendation "Open—Acceptable Response," pending rulemaking action.

The Safety Board is aware that the FAA recently began research designed to provide objective, quantitative data on the current scheduling practices among Part 135 operators. The Board commends this initiative but is concerned about the time that may elapse—perhaps several months or more—before the results are available for use by those persons considering regulatory revisions. Had these data been

collected prior to or in conjunction with the efforts of the ARAC on flightcrew scheduling, the committee would have benefited from the information.

The advantage of the ARAC approach, according to the FAA, is an anticipated reduction in the time interval from the release of an NPRM to the issuance of a final rule because industry has an opportunity early in the rulemaking process to offer substantive input that shapes the content of the proposed rule. The Safety Board supports the FAA's efforts to shorten the rulemaking process but believes that the ARAC process is not suitable for highly contentious issues, such as flight and duty regulations. In such cases, the rulemaking process may actually be lengthened by a series of ARAC meetings that result in little or no consensus among participants. The Safety Board encourages the FAA to conduct a review of the ARAC process with the purposes of assessing the effectiveness of the process and establishing criteria for determining when the ARAC process can be expected to expedite or delay rulemaking.

## Chapter 4

# Dispatch Services

One of the key distinctions between flight operations conducted under Part 135 and those conducted under domestic Part 121 concerns the use of licensed flight dispatchers for flight planning and operational control. There is no regulatory requirement for a licensed dispatcher for flights operated under Part 135. Part 135 requires only that the operator have procedures for locating each flight for which an FAA flight plan is not filed; there are no requirements for continuous flight monitoring by a licensed dispatcher. Under Part 121, no scheduled passenger flight may be operated without the authorization of a dispatcher who is licensed by the FAA.

A dispatcher is responsible for being thoroughly familiar with reported and forecast weather along the flight path and for providing necessary guidance and information for the safe conduct of the flight. A dispatch release specifying information critical to the flight (including minimum fuel required, routing, and intermediate stops) must be signed by both the pilot-in-command and the dispatcher prior to each flight. The pilot-in-command and the dispatcher have joint responsibility for and operational control over the safe conduct of any scheduled passenger flight operated under Part 121. If either individual believes the flight cannot be conducted safely, the flight may not operate. Once the flight is underway, the dispatcher is required to continuously monitor the progress of the flight and to notify the pilots of any changes in weather or air traffic control delays. This requirement provides redundancy to avert errors by the pilot-in-command. No such redundancy is provided in Part 135 operations.

## Airline and Pilot Responses to Questions About Dispatch Services

The Safety Board's site survey devoted several questions to dispatch services. Commuter airline officials were asked if their company currently provides Part 121 dispatch services for its scheduled Part 135 operations. Of the 19 who responded, 4 airlines (21 percent) provide licensed dispatch services for their Part 135 operations; in each of the 4 cases, the airline also operates domestic Part 121 passenger service. Four other airlines that also operate scheduled Part 121 passenger service do not use their dispatch services for their Part 135 operations. During the survey interviews with Safety Board staff, several airline officials reported that although their companies currently do not provide licensed dispatch services for their commuter

operations, they do require their flight-monitoring personnel to be licensed dispatchers as a condition of employment.

Airlines were also asked who routinely obtains weather information, calculates weight and balance, and provides fuel specifications for each flight. The four airlines that provide licensed dispatch services were the only ones that do not require pilots to obtain weather information; the information is provided by the dispatchers. According to officials from the other 16 airlines that responded, weather information typically is made available to the pilots at each station through computerized services, station agents, or ramp personnel. Nineteen (95 percent) of 20 airlines reported that their pilots are responsible for calculating weight and balance for each flight. Only one of the carriers does not require the flightcrew to perform weight and balance calculations; the calculations are performed by ramp personnel or station agents and provided to the flightcrew before departure.

Pilots at 11 (55 percent) of the 20 responding airlines are required to calculate the minimum fuel load for each trip; company personnel calculate minimum fuel loads at the remaining 9. Company personnel also calculate the maximum fuel load at 2 of the airlines.

Pilots at 16 (80 percent) of the 20 airlines are required to calculate weight and balance and to obtain weather information for the trip. Pilots at 4 airlines (20 percent) are required to calculate weight and balance, obtain weather information, and compute the minimum fuel load for each trip. Only 1 of the 20 airlines does not require pilots to calculate weight and balance or to obtain weather; licensed dispatch personnel provide these services. "Canned" flight plans<sup>28</sup> are used by 17 (85 percent) of the 20 carriers.

Pilot responses to questions about dispatch services, and comments made during the public forum, reflect concerns about increased management pressure to shorten the amount of time on the ground between flights, which in turn increases pilot workload. Some pilots indicated that it was extremely difficult for them to accomplish all of the necessary tasks and to verify that the tasks were done correctly in the amount of time that is made available to them. Pilots also reported that the pressure was more keenly felt by newly employed captains and first officers, who believe that their performance evaluations would suffer if they are responsible for flight delays. The pilots also reported that they would feel much more confident if their calculations of weight and balance or the amount of fuel required for the flight were verified by a trained and licensed dispatcher.

The Safety Board believes that airline management has a responsibility to provide pilots with adequate resources (such as qualified personnel and time) to accomplish required tasks during ground operations between flights, particularly

---

<sup>28</sup> A canned flight plan is a standard air routing that is filed with air traffic control in advance, and then is requested prior to departure.



when licensed dispatch services are not provided. Yet, the survey results suggest that commuter pilots are facing increasing pressures to accomplish several tasks during turnarounds in shorter periods of time. Because these pressures increase the risk of critical mistakes that could jeopardize the safety of flight, the Safety Board believes that principal operations inspectors of the FAA should periodically review commuter air carrier flight operations policies and practices concerning pilot tasks between flights to ensure that pilots are provided with adequate resources (such as time and personnel) to accomplish those tasks.

## **FAA Initiatives To Address Dispatch Services for Part 135 Operations**

Considerable discussion during the public forum and during survey interviews with airline personnel centered on whether or not there is a need for licensed dispatch services for Part 135 operations. Those who support a requirement for licensed dispatch argue that dispatchers enhance safety through redundancy in providing and verifying information on fuel loads, weather, and weight and balance computations. Further, a trained dispatcher who provides pilots with necessary flight information substantially reduces the workload on pilots, particularly during quick turnarounds of 15 minutes or less when pilots must complete their on-ground operational duties and often oversee the offloading and then loading of baggage, and boarding of new passengers.

Those who oppose a requirement for dispatch services state that licensed dispatchers are unnecessary for Part 135 operations, because of the average distance of most commuter flights and the extant requirements for flight locating (Part 135.79). According to the RAA's 1994 annual report, the average trip length for commuter airlines in 1993 was 201 miles. Opponents to a dispatch requirement argue that on flights of such short duration, the likelihood of significant weather changes en route is very low, aircraft are rarely far away from alternate airports in the event of an emergency, and thus the need for constant flight monitoring by dispatch personnel is minimal. Opponents also argue that the costs of hiring, training, and staffing licensed dispatchers, and of maintaining constant communication with en route aircraft are prohibitive and would drive many small operators of business.

During the public forum, the FAA reported that it has established a working group to address the issue of dispatch services for Part 135 operations. The group began meeting in the spring of 1994 and is currently conducting a cost/benefit analysis on a requirement for licensed dispatchers for Part 135 operations. Although the group has not completed its efforts, preliminary information from FAA suggests that startup costs associated with such a requirement would be substantial.

The complexity of scheduled Part 135 operations places considerable burden on the pilots that could be reduced by use of a dispatch system. Thus, the Safety Board believes that any regulatory decision must consider the long-term operational benefits and safety enhancements to the flying public associated with providing dispatch services, not just the economic impact such a requirement may have on airlines of various sizes. The Safety Board looks forward to reviewing the results of the working group's efforts.

## Chapter 5

# Pilot Training and Qualifications

The past 14 years of commercial aviation have witnessed the emergence and widespread acceptance by the aviation community of crew resource management (CRM) training, the continued development and use of advanced simulators for pilot training, and increased popularity of contract training centers. These developments have affected the pilot training practices and standards in the commuter airline segment of the industry, and have led to recent FAA initiatives to address deficiencies in pilot training programs.

## Crew Resource Management Training

One of the major changes in commercial pilot training over the past 15 years has been the emergence and development of CRM training programs. CRM has been defined as "using all available resources—information, equipment, and people—to achieve safe and efficient flight operations."<sup>29</sup> Originally called *cockpit* resource management because early programs focused almost exclusively on the use of resources inside the cockpit, *crew* resource management reflects a broadening of scope to include extra-cockpit resources such as flight attendants and maintenance, air traffic control, and dispatch personnel. The importance of CRM has been demonstrated repeatedly in the performance (both positive and negative) of flightcrews during accidents, and the Safety Board has been a vocal proponent of the need for formal, comprehensive training on CRM skills.<sup>30</sup>

The Safety Board first addressed the subject of CRM training for Part 135 operators in Safety Recommendation A-90-135, issued on November 21, 1990, in connection with its investigation of an accident involving an Aloha IslandAir DHC-6

---

<sup>29</sup> Lauber, John K. 1984. Resource management in the cockpit. *Air Line Pilot*. 53: 20-23.

<sup>30</sup> A review of Safety Board findings and recommendations pertaining to CRM through 1990 is provided in the following publication: Kayten, Phyllis, J. 1993. The accident investigator's perspective. In: Weiner, Earl L.; Kanki, Barbara G.; Helmreich, Robert L., eds. *Cockpit resource management*. San Diego, CA: Academic Press: 283-314. Chapter 10.

that crashed in Hawaii on October 28, 1989.<sup>31</sup> The safety recommendation asked the FAA to:

Require that scheduled 14 CFR Part 135 operators develop and use Cockpit Resource Management programs in their training and methodology by a specified date. (A-90-135)

In its February 8, 1991, letter to the Safety Board, the FAA expressed plans to require Part 135 operators to follow Part 121 requirements for CRM training once the requirements are established. The FAA informed the Safety Board that an NPRM proposing revisions to the pilot training requirements contained in Part 121 and 135 would be released shortly, and that the proposed revisions would include a requirement for CRM training for pilots, flight dispatch personnel, and flight attendants. As a result, the Safety Board classified this safety recommendation "Open—Acceptable Response" pending adoption of the final rule.

The Safety Board reiterated Safety Recommendation A-90-135 following its investigation of the crash of a Beech C99, operated by GP Express Airlines, in Anniston, Alabama, on June 8, 1992.<sup>32</sup> The investigation revealed that a reversal of roles occurred during an unstabilized approach in which the first officer refused to take directions from the captain, and the captain was not assertive with the first officer.

The FAA addressed CRM training in Advisory Circular (AC) 120-51A, "Crew Resource Management Training," issued on February 10, 1992. The Safety Board supports the guidance provided by the AC (which is discussed in the following paragraphs) but is disappointed that the FAA has not mandated such training, as requested in Safety Recommendation A-90-135. Because the FAA has not required CRM training, and because of the amount of time that has elapsed, the Safety Board reclassifies the recommendation "Open—Unacceptable Response."

According to AC 120-51A, which provides nonregulatory guidance to Part 135 and 121 operators regarding the content of CRM training programs, a comprehensive CRM training program should include three components. First, initial *indoctrination and awareness* training introduces crewmembers to the concepts and skills of CRM through classroom discussion, videotape presentations, and role playing exercises or other methods through which crewmembers can actively practice CRM skills. Second, *recurrent practice and feedback* sessions reinforce CRM skills by placing flightcrews in realistic flight scenarios (using advanced training devices or simulators)<sup>33</sup> and

<sup>31</sup> National Transportation Safety Board. 1990. Aloha IslandAir, Inc., flight 1712, DeHavilland Twin Otter, DHC-6-300, N707PV, Halawa Point, Molokai, Hawaii, October 28, 1989. Aircraft Accident Report NTSB/AAR-90/05. Washington, DC.

<sup>32</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-93/03.

<sup>33</sup> Advanced training devices and simulators are discussed later in this chapter.

giving them feedback about their performance. A principal means through which recurrent practice is accomplished is through line-oriented flight training (LOFT). According to Advisory Circular AC 120-35B, "Line Operational Simulations," issued by the FAA on September 6, 1990, LOFT is defined as "...training in a simulator with a complete crew using representative flight segments which contain normal, abnormal, and emergency procedures that may be expected in line operations." The circular advises air carriers to design LOFT scenarios that will provide crews with the opportunity to practice technical and CRM skills during routine and abnormal flight conditions. The third component of a comprehensive CRM training program involves the *continuing reinforcement* of CRM skills throughout training and line operations by check airmen, instructors, and managers who are supportive of CRM.

CRM training has been embraced by most, if not all, major U.S. airlines. However, there is little information available on the extent to which commuter airlines provide CRM training to their flightcrews. The Safety Board obtained some information on airlines' CRM training programs during the commuter airline surveys. Officials at 13 of the 21 participating airlines (62 percent), reported that they provide formal CRM training to their pilots. All 13 airlines provide CRM training to pilots during initial ground school, 12 to pilots during captain upgrade training, 10 during recurrent training, and 6 to pilots when they make a transition to a new aircraft type. The amount of time devoted exclusively to CRM training during initial ground school ranged from 2 hours (4 airlines) to 16 hours (1 airline). Seven of the 13 airlines (54 percent) provide 4 hours of formal CRM training, and 1 airline provides 8 hours of CRM training.

Officials from the 13 airlines that provide CRM training to their pilots were asked what instructional methods are used: 11 airlines provide written material to pilots; 10 use videotape presentations in their CRM training programs; and 8 conduct role playing exercises during training. Only 5 airlines use all three of these instructional methods in their CRM training programs.

Five of the 21 airlines who were surveyed (24 percent) indicated that they conduct LOFT. This training is generally provided to pilots during initial training, or to pilots who are upgrading to captain or making a transition to a new type of aircraft. Only one airline provides LOFT during recurrent pilot training.

The survey results suggest that although most of the airlines in the sample provide some form of CRM training to their pilots, very few offer a fully integrated, comprehensive program, as is recommended in AC 120-51A. For example, among the 13 airlines that offer CRM instruction during initial pilot training, some (4 airlines) provide only a cursory 2-hour introduction to CRM, and others (5 airlines) do not provide pilots with the opportunity to practice CRM skills through role playing or other group exercises. Also, only 10 out of the 21 airlines that were surveyed (48 percent) provide formal CRM training as part of recurrent pilot training, and only 1 airline incorporates LOFT into its recurrent pilot training program.

The Safety Board remains concerned that many commuter air carriers still do not provide any formal CRM training to their flightcrews, and that other air carriers fail to provide comprehensive training that includes recurrent practice and feedback on the use of CRM skills. Research has demonstrated clearly that, in the absence of continuous reinforcement of CRM skills, pilot attitudes about the value and usefulness of CRM training and LOFT deteriorate.<sup>34</sup>

The absence of effective CRM training was discussed by the Safety Board in the investigations of two recent accidents: Hibbing, Minnesota (December 1, 1993), and Columbus, Ohio (January 8, 1994).<sup>35</sup> In both cases, the Safety Board found that the pilots had received limited CRM training consisting of handouts and some discussion of accidents involving other air carriers. The training also did not provide the pilots with the opportunity to practice CRM skills designed to improve crew coordination and teamwork. The pilots involved in the Hibbing, Minnesota, accident had received CRM training, but the majority of information was in the form of handout material intended for students to study independently.

The Safety Board believes that many carriers will continue to provide cursory CRM training that translates to minimal improvements in crew performance during line operations unless the FAA's anticipated revision to the Part 135 and Part 121 pilot training rules requires comprehensive CRM training, as outlined in AC 120-51A. The Safety Board therefore urges the FAA to incorporate the principal components of crew resource management training, as provided in AC 120-51A, in its revisions of Part 121 and Part 135 training requirements.

Also as a result of the Anniston, Alabama, investigation, the Safety Board recommended that the FAA:

Develop guidance and evaluation criteria for principal operations inspectors to use to ensure that airline cockpit resource management training programs adequately address crew interaction, decision-making process, information gathering, flightcrew communication, and leadership skills. (A-93-37)

In its June 16, 1993, response to Safety Recommendation A-93-37, the FAA indicated that the recommended guidance for principal operations inspectors is provided in AC 120-51A. The Safety Board indicated its support of the guidance provided in AC 120-51A in a reply to the FAA on November 19, 1993, and agreed that the AC was appropriate guidance for FAA principal operations inspectors to use in

<sup>34</sup> Helmreich, Robert L. 1991. The long and short term impact of crew resource management training. In: Challenges in aviation human factors; the national plan: Proceedings, AIAA/NASA/FAA/HFS conference; 1991 January; Vienna, VA.

<sup>35</sup> National Transportation Safety Board. Aircraft Accident Reports NTSB/AAR-94/05 and NTSB/AAR-94/07, respectively.

evaluating air carrier CRM training programs. Accordingly, the Safety Board classified Safety Recommendation A-93-37 "Closed—Acceptable Action."

## **Availability and Use of Flight Simulators and Advanced Training Devices**

Another major change in commuter airline pilot training since the Safety Board's 1980 study is the increased availability of flight simulators and advanced training devices (ATDs).<sup>36</sup> The Safety Board, and the aviation community in general, has long recognized the advantages of training and checking conducted in a simulator as opposed to an airplane. Simulator training is inherently safer; consequently, hazardous maneuvers that cannot be attempted in an airplane can be practiced safely in a simulator. Also, pilot training conducted in company airplanes usually must take place at night, when the airplanes are not being used for revenue operations, so pilot and instructor fatigue can be a safety concern and reduce the value of the training.

In its 1980 study, the Safety Board noted that commuter airline pilot training would benefit greatly from increased use of flight simulators and procedural trainers, and urged the FAA and the commuter airline industry to "...encourage the development of sufficient numbers and types of aircraft flight simulators needed to upgrade the quality and scope of commuter airline training."

In 1986, following its investigations of three fatal commuter airline accidents,<sup>37</sup> the Safety Board issued the following recommendations to the FAA and RAA, respectively:

Expedite the program which proposes standards for the use and evaluation of aircraft flight simulator devices to be used in training programs of 14 CFR 135 operators and in cooperation with the Regional Airline Association, encourage and assist operators to acquire flight simulator devices. (A-86-103)

---

<sup>36</sup> According to NPRM 92-10, "Aircraft Flight Simulator Use in Pilot Training, Testing, and Checking and at Training Centers," there are three major differences between flight simulators and ATDs: (1) ATDs can have an open-air cockpit, whereas flight simulators cannot; (2) flight simulators are required to have a motion system, whereas ATDs are not and, (3) except for designated "non-visual" simulators, all flight simulators must have a visual system, whereas ATDs need not. (The NPRM is discussed later in this chapter.)

<sup>37</sup> National Transportation Safety Board. Aircraft Accident Reports NTSB/AAR-86/06, NTSB/AAR-86/07, and NTSB/AAR-87/02.

Work with [RAA] membership to encourage the use of flight simulators or Advanced Training Devices in the pilot training programs of commuter airlines. (A-86-120)

In 1987, the FAA responded to Safety Recommendation A-86-103 by distributing two advisory circulars that address ATDs: AC 120-45, "Advance Training Devices (Airplane Only) Evaluation and Qualification," provides guidelines for the evaluation of ATDs intended for use in Part 135 pilot training programs; and AC 120-46, "Use of Advanced Training Devices (Airplane Only)," provides guidelines for the use of ATDs in Part 135 pilot training programs. The ACs establish the basis that encourages Part 135 operators to incorporate simulators in their training programs; operators are allowed to use the simulators under Part 135 by petitioning for and being granted an exemption to pertinent regulations under Part 135. In 1987, the FAA granted a petition for exemption (Exemption 4905) submitted by the RAA that allows RAA member airlines to use ATDs and simulators in their recurrent pilot training and checking programs.

Safety Recommendation A-86-103 to the FAA was classified "Closed—Acceptable Action" on February 23, 1989, based on the FAA's issuance of AC 120-46 and granting of the exemption to the RAA. Safety Recommendation A-86-120 to the RAA was classified "Closed—Acceptable Action" on June 7, 1988, based on the RAA's distribution of AC 120-45 and AC 120-46 to member airlines and the RAA's continuous encouragement to member airlines to purchase and use ATDs for pilot training.

The availability of flight simulators was an issue addressed in the Safety Board's investigation of the 1991 Block Island, Rhode Island, accident that occurred during a night training flight in a Beechcraft BE 1900.<sup>38</sup> Following its investigation, the Safety Board issued two additional safety recommendations to the FAA, and one to the RAA, to encourage the use of flight simulators in Part 135 pilot training. The recommendations to the FAA stated:

Encourage commuter airline managers to use approved flight simulators for pilot training, qualification, and competency and instrument check purposes to the maximum extent feasible. (A-93-71)

Consider an amendment to 14 CFR Part 135 to require that commuter air carriers perform certain hazardous training, testing, and checking maneuvers, such as engine-out operations and recovery from unusual flight attitudes, in approved flight simulators to the maximum extent feasible. (A-93-72)

The recommendation to the RAA stated:

---

<sup>38</sup> National Transportation Safety Board. Aircraft Accident/Incident Summary Report NTSB/AAR-93/01/SUM.



Encourage [RAA] members to use approved flight simulators for required pilot training, qualification, and competency and instrument check purposes to the maximum extent feasible. (A-93-73)

In its September 1, 1993, response to Safety Recommendation A-93-71, the FAA indicated that it would issue an air carrier operations bulletin (ACOB) to encourage air carriers to use flight simulators in their training programs. Pending issuance of the ACOB by the FAA, Safety Recommendation A-93-71 was classified "Open—Acceptable Response" on December 28, 1993, and remains in that status.

In response to Safety Recommendation A-93-72, the FAA reported on September 1, 1993, that rulemaking under consideration may require that Part 135 pilot training be conducted under Subparts N and O of Part 121, which encourages and permits the use of simulators in pilot training.<sup>39</sup> Pending FAA rulemaking action, the Safety Board classified Safety Recommendation A-93-72 "Open—Acceptable Response" on December 28, 1993.

Following the RAA's issuance in July 1993 of a bulletin to member airlines encouraging the use of flight simulators in pilot training programs, the Safety Board classified Safety Recommendation A-93-73 "Closed—Acceptable Response" on November 19, 1993.

The commuter airline survey obtained information about the degree to which participating airlines use simulators in their Part 135 pilot training programs. Of the 21 participating airlines, 14 (67 percent) reported that they use flight simulators in some aspect of their pilot training program. Of the remaining seven airlines, two operate only airplanes for which there are no training simulators available, and five indicated that they do not use simulators because of cost and the lack of nearby simulator training facilities. Also, an official from one of the airlines that does not use simulators stated that he believes the quality of training conducted in a simulator is not as high as the quality achieved from training in the airplane.

Flight simulators have been developed for nearly all airplanes with 10 or more passenger seats that are currently used in commuter air operations. A notable exception to this is the Jetstream J-4101, the aircraft type involved in the 1994 fatal accident in Columbus, Ohio. The airplane, operated by Atlantic Coast Airlines (as United Express), crashed following an aerodynamic stall when the flightcrew failed to monitor airspeed and then improperly responded to a stall warning during a high-speed, instrument approach.<sup>40</sup> At the time of the accident, Atlantic Coast Airlines was the only operator of the J-4101 in the United States, and no simulator had yet been approved for training purposes. The first training simulator is scheduled to become available in December 1994. In its probable cause statement, the Safety

---

<sup>39</sup> The rulemaking is discussed later in this chapter.

<sup>40</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-94/07.

Board determined that the unavailability of suitable training simulators that precluded fully effective flightcrew training contributed, in part, to the accident.

The Safety Board is concerned that, unlike large transport airplanes used in Part 121 operations, new airplanes such as the Jetstream J-4101 continue to be introduced into commuter airline operations before simulators are made available for pilot training. The Board recognizes that economic considerations contribute toward the widespread use of training simulators among airlines that operate large transport airplanes: the cost of training in a simulator is usually less than the cost of training in an airplane. With smaller aircraft, however, the cost of training in an airplane may be comparable to or lower than the cost of conducting training in a simulator. Also, from an aircraft manufacturer's perspective, the high costs associated with designing and building a flight simulator suitable for training can be justified economically only after receiving assurances that a sufficient number of airplanes will be purchased and utilized by air carriers.

However, the Safety Board believes that the inherent advantages of conducting pilot training in a simulator warrant a reconsideration of the perspective that a training simulator is a luxury aid to flightcrew training programs that can be utilized when affordable. The use of simulators enables air carriers to conduct LOFT and to train pilots more effectively on hazardous maneuvers and emergency procedures such as windshear recovery, recovery from unusual attitudes, and low-altitude stall recovery. Further, the Board also believes that industry and government should consider a training simulator as a necessary component in the overall systems design, manufacture, and certification of a new airplane. Therefore, the Safety Board believes that the FAA should revise the certification standards for Part 25 and for Part 23 (commuter category) aircraft to require that a flight simulator, suitable for flightcrew training under Appendix H of Part 121, be available concurrent with the certification of any new aircraft type.

The FAA has long recognized the value of simulator training and checking for Part 121 operations. In 1981, the FAA published Appendix H to Part 121, "Advanced Simulator Plan," to encourage the use of simulators in flightcrew training. Appendix H describes the simulator and visual system requirements necessary to conduct various types of training and checking in flight simulators. Currently, Appendix H applies only to Part 121; because there is no counterpart for Part 135, a Part 135 operator can conduct training in a simulator only if granted an exemption from the applicable Part 135 regulations, such as the exemption granted to RAA member airlines in 1987.

The Safety Board believes that training and checking in flight simulators, whether conducted under Part 121 or 135, should be the standard, where possible, not the exception. Consequently, the Safety Board urges the FAA to revise the pilot training regulations such that all pilot training for aircraft with 10 or more passenger seats be conducted under Subparts N and O of Part 121.

## **Advance Qualification Program**

On October 2, 1990, the FAA adopted Special Federal Aviation Regulation (SFAR) No. 58, Advance Qualification Program (AQP), which provides an alternative method for qualifying, training, certifying, and otherwise ensuring the competency of crewmembers and others who are required to be trained and qualified under the provisions of Parts 121 and 135. Training conducted under the AQP provides for the increased use of approved flight simulators and training devices in air carrier training programs, and emphasizes the instruction and assessment of CRM skills through line-oriented simulations, such as LOFT.

The Safety Board supports the intent of the AQP for pilot training, and believes that the AQP will encourage the use of simulators and training devices in commuter air carrier training programs. Part 135 air carriers may apply to the FAA to conduct pilot training under the AQP, and the FAA is currently developing a model AQP training program targeted to commuter air carriers. The AQP also supports the establishment of training centers with which air carriers can contract for the complete training, qualification, and evaluation of air carrier personnel or for services that are less comprehensive.

## **Contract Training Centers**

In recent years, a growing number of companies have offered FAA-approved, professional flight training services. The use of this type of training service has become popular among commuter operators. The expense of sophisticated, high-fidelity flight simulators has prevented most commuter operators from purchasing their own simulators. As a result, many of these companies provide training facilities and services under contract to airlines. The services provided by these contract training centers include the screening and selection of pilot candidates; initial ground school and flight training of newly hired pilots; aircraft transition, captain upgrade, and recurrent training and check flights; and CRM training and LOFT.

The extent to which airlines utilize the equipment and services of contract training centers varies widely. In some cases, airlines use their own instructors and simply lease time in the training center's simulators. In other cases, airlines contract out the conduct and administration of their entire pilot training program, including the screening and selection of pilot candidates. Training centers may provide pilot training in accordance with their own FAA-approved training program(s), or they may receive FAA approval to conduct training in accordance with the airline's FAA-approved training program. When a contract training center receives approval to conduct the training program of a specific air carrier, the training center's instructors are required to undergo "differences training" to ensure that they are adequately

familiar with the unique policies and operating procedures of the airline. Differences training typically involves a specified number of hours of line observation and LOFT administered by the airline's training personnel (such as a flight instructor or director of training).

The Safety Board believes that contracted training can provide many benefits to commuter airlines such as uniformity of instruction, access to flight simulators and more experienced instructors, and for smaller air carriers a reduction in workload for senior management and pilots who would otherwise be occupied with training and check flights in addition to their other responsibilities. Nevertheless, the Safety Board has, in past accident investigations, expressed concerns related to the quality of training provided by contract instructors, the ability of training centers to provide adequate instruction in company-specific policies and procedures, and the adequacy of FAA surveillance of training programs conducted at contract training centers. Concerns of the aviation community about contract instructor qualifications and the quality of training provided by contract training centers were also expressed to Safety Board staff at the 1994 public forum and during the commuter airline survey conducted in conjunction with this study.

In its investigation of the 1992 accident in Anniston, Alabama, involving GP Express Airlines, the Safety Board found that the captain had been hired and trained as a captain through a contract training company, had no commuter air carrier experience before his employment at GP Express, and was on his first day of unsupervised duty with the airline.<sup>41</sup> As a result, the captain was unfamiliar with the company's aircraft, routes, and procedures; and was inexperienced as a captain on commuter air carrier operations. In its review of the contract training program, the Safety Board concluded that the contract instructor who provided training to the captain was insufficiently familiar with the specific line operations and procedures of GP Express Airlines to adequately prepare the captain for his role as pilot-in-command for GP Express. Upon completion of its investigation, the Safety Board issued the following safety recommendation to the FAA:

For airlines that utilize contracted flight and ground training programs, require that pilots hired directly to be captains receive additional flight instruction pertaining to the operating environment and procedures unique to the airline from an FAA-approved company check airman or instructor, rather than only from the contractor instructor. (A-93-38)

In its June 16, 1993, response to the recommendation, the FAA stated that:

The source of training, whether operator or contractor, is irrelevant. The pilot who is hired as a captain or who is upgraded must meet the pilot-in-command qualification requirements of 14 CFR Part 135, Subpart E, Flight Crewmember Requirements. Section 135.244 requires

---

<sup>41</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-93/03.

experience in 14 CFR Part 135 operations prior to serving as a pilot-in-command.

Based on the FAA's response, the Safety Board classified Safety Recommendation A-93-38 "Closed—Reconsidered" on November 19, 1993.

Safety Recommendation A-93-38 and the FAA's response both addressed the qualification requirements of pilots-in-command (PICs) under Part 135. Section 135.244 outlines the Part 135 initial operating experience (IOE) requirements for a PIC. These requirements state that no pilot may serve as PIC unless the pilot has completed a specified number of hours of supervised line operating experience that is acquired during revenue passenger operations. One purpose of IOE is to ensure that a PIC is proficient in the knowledge and demonstration of company policies and procedures during line operations. Under Part 121, there are IOE requirements for both PICs and second-in-command (SIC) crewmembers; however, there are no IOE requirements for SICs under Part 135. Thus, there is no requirement for evaluating the proficiency of SICs on company-specific policies and procedures.

During the commuter airline surveys, pilots frequently remarked to Safety Board staff that newly trained pilots are technically proficient, but they are not good crewmembers. The pilots explained that newly trained pilots know how to fly the airplane, but they are inadequately trained in company procedures and often have little or no previous air carrier experience to draw on. The pilots continued by stating that sometimes the newly trained pilots can be a liability, rather than an asset, in the cockpit. Of the 58 pilots who were asked, 17 (29 percent) indicated they did not believe that newly trained pilots (captains and first officers) with whom they fly during line operations are adequately trained for their duties. When asked what additional training would better prepare them for line operations, these pilots responded that either CRM, IOE, or both would be beneficial.

The Safety Board believes that IOE is a necessary component of the overall training and evaluation program for every crewmember who flies commuter operations. An air carrier that contracts out its training program needs to evaluate the ability of each pilot to demonstrate adequate knowledge and use of the air carrier's specific procedures upon completion of training, whether the pilot is serving as PIC or SIC. Not only does IOE provide the air carrier with a means of assessing the performance of its newly trained pilots, closely-monitored IOE can provide insights regarding the strengths and weaknesses of the air carrier's training program. This is especially valuable information when the training is not being administered by company personnel. Thus, the Safety Board believes that the FAA should revise 14 CFR 135.244 to require that all commuter airline pilots complete the initial operating experience currently required of Part 135 pilots-in-command.

## Part 142 Training Centers

On August 11, 1992, the FAA issued proposed rulemaking (NPRM 92-10) that would establish certification and operating rules for training centers under a newly created 14 CFR Part 142. Under the proposed rules, training center certification would be required of any organization that provides training under contract to a Part 121 or Part 135 certificate holder. Consequently, Part 142 training centers would include current contract training companies that operate under exemptions from the FAA (such as Flight Safety International or Reflectone Training Center), as well as aircraft manufacturers and air carriers that provide training services to personnel of other certificate holders. Currently, contract training is conducted under exemptions that are granted on a case-by-case basis by local FAA offices. The NPRM describes the concept of Part 142 training centers as follows:

The advantage of the proposed training center concept is that it would provide a common source for standardized, quality training accessible to any individual, operator, or air carrier. Training center certification would establish training rules separate from those for operations conducted under authority of certificates issued under other parts of this chapter. Program approval would be standardized through a national office, which should prove especially helpful for training centers operating in different FAA regions. The rules applicable to training centers would apply nationwide, and training programs would not be subject to approval by local FAA offices.

The Safety Board supports the intent of the proposed rulemaking and believes that the proposed requirements under Part 142 will improve the quality of contract training services, and the ability of the FAA to more effectively monitor such programs, through increased operational standardization. Further, by standardizing and centralizing the training center certification process, the proposed requirements under Part 142 likely will further encourage the establishment of training centers that utilize flight simulators and advanced training devices in their pilot training programs. Because the rulemaking has been proposed for 2 years, the Safety Board believes that the FAA should complete the rulemaking process and issue within 6 months a final rule for 14 CFR Part 142 concerning the certification and operation of training centers.

## Flightcrew Pairing Policies and Practices

The Safety Board has previously addressed the issue of pairing inexperienced flightcrew members. As a result of its investigations of the three commuter air carrier accidents that occurred between August 1985 and March 1986,<sup>42</sup> the Safety Board issued the following recommendation to the FAA on October 9, 1986:

Issue an Air Carrier Operations Bulletin—Part 135, directing all principal operations inspectors to caution commuter air carrier operators that have instrument flight rules authorization not to schedule on the same flight crewmembers with limited experience in their respective positions. (A-86-107)

The FAA responded to the recommendation by issuing ACOB 87-2, "Commuter Flightcrew Scheduling," which directed all POIs to caution commuter air carrier operators who have instrument authorization not to schedule flightcrew members with limited experience in their respective positions on the same flights. Based on the issuance of the ACOB, the Safety Board classified Safety Recommendation A-86-107 "Closed—Acceptable Action" on November 27, 1987.

Also as a result of the same investigations, the Safety Board asked the RAA to:

Encourage its membership to institute a policy of pilot scheduling which would prevent the scheduling on the same flight of cockpit crewmembers with limited experience in their respective positions. (A-86-122)

In response to the Board's recommendation, the RAA distributed copies of the appropriate ACOBs to its Part 121 and Part 135 member airlines, and recommended that member airlines implement a company policy for having the pilot-in-command (a) make all takeoffs when weather conditions require the use of lower-than-standard takeoff minimums, and (b) make all landings when adverse or marginal weather conditions exist. Based on the actions taken by the RAA, the Safety Board classified Safety Recommendation A-86-122 "Closed—Acceptable Action" on June 7, 1988.

---

<sup>42</sup> National Transportation Safety Board. Aircraft Accident Reports NTSB/AAR-86/06, NTSB/AAR-86/07, and NTSB/AAR-87/02.



As a result of the Safety Board's investigation of the November 15, 1987, crash of Continental Airlines flight 1713 (operated under Part 121),<sup>43</sup> on November 3, 1988, the Board recommended that the FAA:

Establish minimum experience levels for each pilot-in-command and second-in-command pilot, and require the use of such criteria to prohibit the pairing on the same flight of pilots who have less than the minimum experience in their respective positions. (A-88-137)

In its May 30, 1989, letter to the Safety Board, the FAA responded that it may not always be practical or possible to schedule an experienced crewmember with an inexperienced crewmember, particularly if the air carrier is newly certificated or has recently initiated a new kind of operation. The FAA response also noted its release on January 21, 1988, of ACOB 8-88-1, "Flight Crewmember Experience and Scheduling," which had been issued to all principal operations inspectors. The FAA further stated that:

On July 19, 1988, the FAA issued Action Notice 8430.22 to request that the Principal Operations Inspectors review their certificate holder's policies and procedures to determine what, if any, actions have been taken by the certificate holder to implement the guidelines specified in the appropriate ACOB or to amend any existing policies and procedures. The FAA conducted a survey of all U.S. air carriers following this review which showed that 41 percent of the 14 CFR Part 121 carriers and 26 percent of the 14 CFR Part 135 carriers had policies regarding minimum experience levels when pairing pilots for scheduling purposes. The survey also showed that 52 percent of the 14 CFR Part 121 carriers and 12 percent of the 14 CFR Part 135 carriers had procedures requiring the pilot in command to make all takeoffs and landings when either the pilot in command or second in command is inexperienced. The FAA believes that most U.S. air carriers will develop policies and procedures based upon the recommended practices and guidelines contained in the ACOB, therefore, in light of the expected degree of voluntary compliance with these scheduling practices, combined with the many air carrier training rule making initiatives underway to improve aircrew performance, the FAA believes that rulemaking is unnecessary at this time.

Based on the FAA's refusal to initiate rulemaking, the Safety Board classified Safety Recommendation A-88-137 "Open—Unacceptable Response." On December 8, 1989, the FAA informed the Safety Board that it had "asked the joint government/industry task force to establish a committee to provide recommendations to the FAA regarding pilot experience, crew pairing, and associated training requirements." As

---

<sup>43</sup> National Transportation Safety Board. 1988. Continental Airlines, Inc., flight 1713, McDonnell Douglas DC-9-14, N626TX, Stapleton International Airport, Denver, Colorado, November 15, 1987. Aircraft Accident Report NTSB/AAR-88/09. Washington, DC.



a result of the FAA's action, the Safety Board reclassified Safety Recommendation A-88-137 "Open—Acceptable Response" on January 31, 1990.

The Safety Board reiterated Safety Recommendation A-88-137 following its investigation of GP Express Airlines flight 861 that crashed in Anniston, Alabama, on June 8, 1992.<sup>44</sup> The investigation revealed that the captain had no prior experience in air carrier operations before being hired as captain, and that the accident occurred on the captain's first day of unsupervised revenue operation. Further, the first officer had less than 2 months' experience as second-in-command, and had acquired less than 100 hours in aircraft type prior to the accident.

The action sought in Safety Recommendation A-88-137 may be addressed by rulemaking activity (discussed in the following paragraphs) initiated by the FAA in March 1993. Consequently, the recommendation is being held in its "Open—Acceptable Response" status. The rulemaking may also address action sought in another recommendation issued by the Safety Board following the Anniston, Alabama, accident:

Amend 14 CFR 135.243(c)(2) to require that the pilot-in-command of a commuter air carrier flight that requires two crewmembers have at least 100 hours of flight time or an equivalent level of training in commuter air carrier operations requiring two pilots. (A-93-39)

In its response of June 16, 1993, the FAA indicated that it was considering rulemaking action to address operating experience and crew pairing:

The FAA is considering the issuance of a notice of proposed rulemaking proposing to amend 14 CFR Part 121, Subparts N and O, to increase the operating experience (initial operating experience) requirements and to require "crew pairing" for newly certified flight crewmembers. The FAA is also considering the issuance of a notice of proposed rulemaking proposing to require that 14 CFR Part 135 air carriers (using two pilots) train and qualify crewmembers in accordance with the requirements of 14 CFR Part 121, Subparts N and O.

Based on the FAA's response, Safety Recommendation A-93-39 was classified "Open—Acceptable Response" on November 19, 1993; the recommendation remains in that status.

On March 23, 1993, the FAA released NPRM 93-1, "Pilot Operating and Experience Requirements," which proposes revisions to the Part 121 regulations that would reduce the likelihood of two inexperienced pilots being scheduled for the same flight. Under the proposed rule, a pilot-in-command and second-in-command could not be assigned to the same flight if each has less than 75 hours of line operating

---

<sup>44</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-93/03.

flight time in the aircraft type. The Safety Board reviewed the proposed rulemaking and submitted comments to the Administrator of the FAA in June 1993. In its comments on the NPRM, the Safety Board expressed concern that the proposed restriction on assigning pilots to the same crew if each has fewer than 75 hours is inadequate. While acknowledging that the determination of an appropriate minimum number of hours is somewhat arbitrary, the Safety Board expressed its belief that crewmembers should not be paired together unless at least one pilot has 100 or more hours on the airplane in which they have most recently qualified.

In the commuter air carrier accident in Columbus, Ohio, which occurred after the release of NPRM 93-1, a relatively inexperienced crew was operating the newly certificated Jetstream J-4101.<sup>45</sup> The captain had 150.8 hours of line flight time as PIC on the J-4101, and the first officer had 2.5 hours of line flight time on the J-4101 prior to the accident flight, in which they failed to monitor airspeed during the approach, allowed the airplane to enter into an aerodynamic stall, and failed to perform a proper stall recovery. The investigation revealed that a contractual agreement between the company, Atlantic Coast Airlines (operating as United Express), and the pilots' union kept experienced pilots, who would otherwise be eligible to upgrade to captain or transition to a new aircraft type, in crew positions for a specified period of time. As a result, the captain had been allowed to transition from first officer on the Jetstream J-3201 to captain on the J-4101 without acquiring experience as either a PIC on the J-3201 or as a first officer on the J-4101.

At the time of the accident, Atlantic Coast Airlines had a crew pairing policy that prohibited the pairing of two pilots who each had less than 100 hours in aircraft type; the airline's policy was appropriately applied in the case of the accident crew. During the commuter airline survey conducted in conjunction with this study, airline officials were asked about their company's policy, if any, pertaining to the pairing of inexperienced pilots. Of 19 carriers, 14 (74 percent) indicated that the company has a policy that addresses the pairing of new captains with new first officers. The most common policy reported was a requirement that at least one of the pilots have a minimum of 100 flight hours in the aircraft type. Officials at 5 of the 14 carriers indicated that their crew pairing policy is never waived, 8 indicated that the policy is waived for certain conditions, and 1 did not respond to the question of whether the policy is waived. The reason most frequently cited for waiving the crew pairing policy was the airline's acquisition of new types of airplanes. Also, two airlines indicated that their crew pairing policy could be waived on a case-by-case basis by upper management, and one airline reported that its seniority-based bidding process could result in inexperienced pilots being paired. The Safety Board is unaware of how many air carriers have contractual agreements, similar to that of Atlantic Coast Airlines, that might result in the movement of pilots from first officer on one type of aircraft to captain on another aircraft.

---

<sup>45</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-94/07.

The survey results suggest that Atlantic Coast Airline's crew pairing policy is similar to other airlines—most require one pilot to have at least 100 hours in an aircraft type. Nevertheless, the Safety Board believes that the Columbus, Ohio, accident demonstrates the importance, when making crew assignments, of considering factors beyond the number of flight hours a pilot has in the aircraft. The Safety Board believes that factors such as the number of hours in a crew position and the relative sophistication of the aircraft type are important considerations when pairing crewmembers. Additionally, as tools for assessing performance on CRM skills continue to be developed and refined for use in LOFT and the AQP, air carriers should consider using those tools as valuable sources of information when pairing inexperienced crewmembers.

## **Preemployment Screening and Background Checks**

The quality of preemployment pilot screening and background checks, although not an issue particular to commuter airline operations, has been a recurrent area of concern addressed in several Safety Board accident investigations. On November 15, 1987, Continental Airlines flight 1713 (operated under Part 121) crashed in Denver, Colorado.<sup>46</sup> The investigation revealed that the first officer had been dismissed by his previous employer because of his inability to pass a check flight after 30 hours of training. This information was not obtained through a background check performed for Continental Airlines by a contracted security company. On November 3, 1988, as a result of its investigation, the Safety Board recommended that the FAA:

Require commercial operators to conduct substantive background checks of pilot applicants which include verification of personal flight records and examination of training, performance, and disciplinary records of previous employers and Federal Aviation Administration safety and enforcement records. (A-88-141).

In its response letter of January 30, 1989, the FAA indicated that although it agreed with the intent of the recommendation, "...it does not believe that any benefits derived from such a regulatory change would outweigh the costs of promulgating and enforcing the regulatory change." Based on the FAA's failure to take regulatory action, the Safety Board classified Safety Recommendation A-88-141 "Closed—Unacceptable Action" on November 21, 1990. At the same time, the Board superseded the recommendation with Safety Recommendation A-90-141, based on results from its investigation of the accident involving a commuter airline flight operated by Aloha IslandAir that crashed near Halawa Point, Molokai, Hawaii, on

---

<sup>46</sup> National Transportation Safety Board. NTSB/AAR-88/09.

October 28, 1989.<sup>47</sup> The Safety Board found that the operator's procedure for screening the captain's background was inadequate because FAA enforcement and accident records were not examined and previous employers were not contacted. Subsequently, the Safety Board asked the FAA to:

Require commercial operators to conduct substantive background checks of pilot applicants which include verification of personal flight records and examination of training, performance, and disciplinary records of previous employers, the Federal Aviation Administration safety and enforcement records, and the National Driver Register. (A-90-141).

In its response of February 8, 1991, the FAA indicated it believed that regulatory action to require background checks would be no more effective than voluntary compliance by the airlines, and that airlines have a responsibility to verify the validity of a pilot's certificate. The FAA noted that it had issued Air Carrier Operations Bulletin 8-92-2, "Certificated Airman Preemployment Safety Verification," encouraging airlines to use FAA data bases to verify the validity of an applicant's certificate and safety history. Because the FAA failed to take regulatory action, the Safety Board classified Safety Recommendation A-90-141 "Closed—Unacceptable Action" on October 20, 1992.

On April 22, 1992, Scenic Air Tours flight 22 crashed in Maui Hawaii.<sup>48</sup> The airplane, which was being operated under visual flight rules and the provisions of Part 135 on-demand air taxi operations, collided with mountainous terrain after the captain proceeded into instrument meteorological conditions. The investigation revealed that the captain had falsified his employment application and resumé when applying for a pilot position at Scenic Air Tours, and company personnel failed to conduct substantive background checks to verify the validity of the aeronautical experience reported by the captain. As a result, the Safety Board cited the failure of the operator to conduct, and the FAA to require, substantive preemployment screening as contributing factors in the accident. On February 19, 1993, the Safety Board issued the following recommendation to the FAA:

Require commercial operators to conduct substantive background checks of pilot applicants which include verification of personal flight records and examination of training, performance, and disciplinary records of previous employers, the Federal Aviation Administration safety and enforcement records, and the National Driver Register. (A-93-14).

In its response of April 29, 1993, the FAA disagreed with the recommendation, contending that it is the responsibility of the airlines to verify the validity of a pilot's

---

<sup>47</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-90/05.

<sup>48</sup> National Transportation Safety Board. 1993. Tomy International, Inc., d/b/a Scenic Air Tours, flight 22, Beech model E18S, N342E, in-flight collision with terrain, Mount Haleakala, Maui, Hawaii, April 22, 1992. Aircraft Accident Report NTSB/AAR-93/01. Washington, DC.

certificate. Because the FAA did not take regulatory action, the Safety Board classified Safety Recommendation A-93-14 "Closed—Unacceptable Action" on February 22, 1994.

Currently, the FAA requires air carriers to conduct security checks of pilot applicants only before employment because the applicants have unescorted access to airport security areas. These checks must include reference and employment histories for verification of employment for the preceding 5 years. There is no requirement to verify flight experience or to determine an applicant's FAA accident/incident history or enforcement history, previous employer's pilot training and performance records, and criminal and driver histories. Air carriers are also required to conduct preemployment screens for alcohol and drug use.

The Safety Board obtained information on the types of preemployment background checks conducted by air carriers that participated in the commuter airline survey. Eleven of 20 airlines (55 percent) indicated that they routinely check the Department of Motor Vehicle records of pilot applicants, 14 of 20 airlines (70 percent) request a check of pilot applicants' accident/incident history from the FAA, and 9 of 19 airlines (47 percent) check for past alcohol-involved motor vehicle violations. Sixteen of 20 airlines (80 percent) request and verify the professional references provided by applicants; however, officials at many airlines reported that, with the exception of employment dates, past employers provide little or no information on applicants because of fears of legal action. Of the 21 commuter airlines that participated in the survey, 7 (33 percent) routinely include all of the above checks in their preemployment screening of pilot applicants.

Because some airlines rely on contract training centers to conduct background checks on pilot candidates, the Safety Board also obtained information during the airline survey on the preemployment screening practices of those airlines that use contract training. Of the 10 airlines that use contract training, 4 reported that the airline conducts its own background checks on pilot applicants, 2 rely on the contract training company to conduct background checks, and the remaining 4 use a combination of the company's screening procedures and those of the contract training company. Safety Board staff obtained information on the types of background checks conducted by one major contract training center. Officials at the training center reported that a routine background check conducted on a newly hired pilot applicant includes a verification of FAA licenses and a check for past aviation accidents or incidents through the FAA's airman and accident/incident data bases. Also, a check for alcohol-involved motor vehicle violations is conducted in the State of the applicant's driver license. However, because the training center is not involved in the hiring decision, the verification of a pilot candidate's employment history and professional references is usually the responsibility of the airline that is interested in hiring the pilot.

The Safety Board remains concerned that the FAA still does not require, and many air carriers do not conduct, substantive preemployment background checks on

pilot applicants. The Board will continue to examine the need for regulatory action in this area in its future accident investigations.

## **Action Needed To Address Training Requirements**

Accident investigations and information obtained through the airline survey highlight several deficiencies in the training programs of commuter air carriers. The FAA's regulatory initiatives currently underway address some of the problem areas; most notably, the anticipated issuance of proposed rulemaking that would minimize the differences in pilot qualification and training requirements for Parts 121 and 135 is expected to enhance the quality of training provided to commuter air carrier pilots. However, this major revision to the training requirements must first proceed through a complex process that includes a period of public comment before a final rule is issued; consequently, it will likely be several months, perhaps years, before any major revisions to Part 135 training requirements become effective.

The Safety Board concurs with the FAA's initiative toward uniformity in pilot training requirements for Parts 121 and 135, but urges the FAA to proceed with action on other initiatives discussed earlier in this chapter, such as a requirement for mandatory CRM training programs, the continued promotion and development of the AQP, the certification and operation of Part 142 training centers, and the release of a final rule that addresses pilot operating experience and crew pairing.

## Chapter 6

# Aircraft Maintenance and Inspection

In addition to changes in commuter airline ownership, organization, and equipment since the Safety Board's 1980 study, changes have also occurred with regard to maintenance problems and practices, and regulatory requirements for maintenance and inspection programs. As currently written, the maintenance and inspection program requirements for Part 121 and Part 135 are similar.

Two major changes affecting commuter airlines have been the types of aircraft operated and ownership of some commuter airlines by a code-sharing major airline. The evolution toward increased use of airplanes with 30 to 60 passenger seats has resulted in several commuter airlines operating under both Part 121 and Part 135. As a result, airlines are standardizing their maintenance programs and strengthening the maintenance standards for their Part 135 airplanes to a level commensurate with Part 121. Additionally, code-sharing arrangements with major airlines have, for many commuter airlines, brought access to a broader financial base and engineering support to maintenance and quality assurance operations.

In the 1980 study of commuter airline safety, the Safety Board identified and discussed eight problems concerning commuter airline maintenance:

1. Poor quality of maintenance management;
2. Shortages in the availability of airframe and powerplant mechanics to the commuter industry;
3. High turnover rate of mechanics;
4. Lack of company training for mechanics;
5. Poor recordkeeping;
6. Undue management pressure on the individual mechanics to shortcut procedures;
7. Failure to follow established maintenance procedures for various reasons—training, management pressures, and operational pressures; and
8. Lack of effective FAA surveillance.



In the public forum conducted for the current study, industry representatives were asked which, if any, of these eight problems continue to be areas of concern in the commuter airline industry. The consensus of the participants was that items 6 and 7 continue to be problems, but substantial improvements have been made in those two areas. All other items, according to the participants, are no longer major problems. Participants indicated that the level of experience for commuter airline maintenance managers, overall, is higher today than it used to be, and the economics of the aviation industry has reduced both the shortage and turnover rate of qualified mechanics. Company training for mechanics was characterized as variable throughout the commuter industry, with some airlines doing an excellent job of providing training to mechanics while other airlines continue to provide only minimal training. There was general agreement among participants that maintenance recordkeeping has improved with the increased use of computerized tracking and recording systems, although concern was expressed that some carriers continue to use paperwork systems.

FAA surveillance of air carrier maintenance practices has been addressed by the Safety Board in accident investigations, and was the focus of much discussion at the public forum. In September 1991, the Safety Board investigated an accident involving a commuter flight, operated by Continental Express Airlines, that crashed following the loss of the left horizontal stabilizer leading edge.<sup>49</sup> The Safety Board concluded that lack of compliance with maintenance manual procedures by mechanics, inspectors, and supervisors led to the return of an unairworthy airplane to service. The Safety Board also concluded that "routine surveillance...by the FAA was inadequate and did not detect deficiencies, such as those that led to the accident...." As a result, the Safety Board issued the following recommendations to the FAA:

Enhance flight standards surveillance of Continental Express, to include sufficient direct observation of actual maintenance shop practices, to ensure that such practices conform to the Continental Express General Maintenance Manual and applicable Federal Aviation Regulations. (A-92-6)

Enhance flight standards Program Guidelines, including the National Aviation Safety Inspection Program, to emphasize hands-on inspection of equipment and procedures, unannounced spot inspections, and the observation of quality assurance and internal audit functions, in order to evaluate the effectiveness of air carrier maintenance programs related to aircraft condition, the adherence to approved and prescribed procedures, and the ability of air carriers to identify and correct problems from within. (A-92-7).

---

<sup>49</sup> National Transportation Safety Board. 1992. Britt Airways, Inc., d/b/a Continental Express flight 2574, in-flight structural breakup, EMB-120RT, N33701, Eagle Lake, Texas, September 11, 1991. Aircraft Accident Report NTSB/AAR-92/04. Washington, DC.



In response to the recommendations, the FAA greatly increased the number of inspections, not only at Continental Express, but also at all other commuter carriers nationwide. In June 1993, the FAA advised the Safety Board that between June 1992 and January 1993, it had conducted numerous inspections of all Continental Express maintenance operations at each of the airline's maintenance bases. The FAA also informed the Board that close surveillance, emphasizing the areas of concern cited in Safety Recommendations A-92-6 and -7, would continue. Between June 1 and December 31, 1992, the FAA conducted more than 75,800 unannounced inspections of air carrier maintenance operations and facilities nationwide. Based on this effort, and FAA assurances that efforts would continue at this level, the Safety Board classified Safety Recommendations A-92-6 and A-92-7 "Closed—Acceptable Action."

During the public forum, an FAA representative described a new program designed to provide FAA inspectors with early indications of undesirable trends in the operation and performance of the certificate holders for which they are responsible. This Safety Performance Analysis System (SPAS) tracks several indicators as derived from the inspector's surveillance.<sup>50</sup> A prototype of SPAS was installed at FAA regional offices in 1993, and implementation will begin in 1995 in certain Flight Standard District Offices (FSDOs); SPAS is expected to be fully implemented in 1997.

Results of the commuter airline survey conducted for the current study generally support the views of industry representatives expressed at the forum. Airlines participating in the survey indicated that the maintenance work force has stabilized, and high mechanic turnover rates are no longer experienced. Mechanics at only 2 of the 21 participating airlines indicated that they need additional staffing on the shift they work. The survey also revealed that nearly all commuter airlines are conducting mandatory initial and recurrent training for their maintenance personnel. All but one airline provide mandatory training on each aircraft type operated by the company. Much of the training provided to mechanics and inspectors is conducted by the aircraft manufacturer. Seventeen of the 21 airlines (81 percent) use computers to record and track maintenance tasks.

The airline survey also indicates that FAA surveillance visits to commuter maintenance operations are being accomplished frequently, are often unannounced, and occur on night shifts when maintenance activity is greatest. Nearly all maintenance managers who were surveyed responded that their principal maintenance inspector (PMI) visits at least twice a month, sometimes more often, and is usually unannounced. Only one airline reported that it does not receive unannounced inspections from its PMI. Several airline officials also commented that their company's aircraft undergo frequent FAA ramp checks at outstations.

---

<sup>50</sup> The SPAS is also discussed in chapter 10, "FAA Surveillance."

The Safety Board is not issuing any new safety recommendations related to maintenance and inspections as a result of this study; however, the Board will continue to examine these important areas during its future investigations.

## Chapter 7

# Cabin Safety and Airport Certification

The Safety Board has had a longstanding concern about issues related to crashworthiness and flammability standards of commuter category and transport category airplanes,<sup>51</sup> and flight attendant scheduling and training in operations conducted under Parts 121 and 135.

## Crashworthiness and Flammability Standards

On July 14, 1993, the FAA issued NPRM 93-10, "Occupant Protection Standards for Commuter Category Airplanes," which proposes to revise dynamic test conditions for seat/restraint systems to make them commensurate with the more stringent cabin safety standards contained in Part 25 (transport category airplanes). The NPRM also proposes a prohibition on side-facing seats, an increase in static load factors to ensure retention of mass items in the cabin during emergency landings, and an increase in the flammability standards of passenger seats to levels commensurate with Part 25.

In its comments on the NPRM, the Safety Board urged the FAA to adopt improved crashworthiness and flammability standards for commuter category airplanes to ensure that the standards were commensurate with the improved crashworthiness and flammability standards for Part 25 airplanes. The Safety Board supported the addition of dynamic tests of seats and restraint systems, the requirement to use Head Injury Criterion (HIC), the elimination of side-facing seats in commuter category airplanes, and the requirement for fire-blocking materials in passenger seat cushions. The projected publication date for the final rule is not known.

---

<sup>51</sup> Airplanes used in commuter passenger service are certificated under the airworthiness standards in Part 23 (commuter category) or Part 25 (transport category). Chapter 8, "Aircraft Certification and Equipment Requirements," discusses the airworthiness standards in more detail.

## Flight Attendant Scheduling and Training Issues

Part 135 requires a flight attendant only on aircraft with 20 passenger seats or more. In 1993, 271 of 1,626 airplanes (17 percent) operating in the commuter airline fleet had a passenger seating capacity of 20 to 30 seats and required a flight attendant on board.<sup>52</sup> Of the 224 accidents involving scheduled Part 135 operations that have been investigated by the Safety Board since 1983,<sup>53</sup> only 10 airplanes had a flight attendant on duty.

The Safety Board believes the nature of the safety function performed by flight attendants on Part 135 operations is no different than that performed on Part 121 operations, and the same basic training and performance standards should apply.

The Safety Board has frequently addressed the importance of flight attendant performance during emergency situations. The accident investigations that have prompted safety recommendations pertinent to flight attendant issues have resulted from Part 121 operations. According to the FAA, training requirements for Part 135 flight attendants will be included in the proposed revisions that place Part 135 flightcrew training under Subparts N and O of Part 121. The Safety Board supports action that would provide all flight attendants the quality of training and standards of performance required in Part 121 operations.

***Flight Attendant Duty Limits and Rest Requirements.***—The Safety Board has been a strong advocate for duty limits for flight attendants, and notes that on August 19, 1994, the FAA released its final rule on flight and duty limits and rest requirements for flight attendants. The rule, which became effective November 18, 1994, applies to Part 121 and Part 135 operations, establishes limits on the maximum time flight attendants may be scheduled for duty, and outlines the minimum rest requirements between duty periods. Under the new rule, flight attendants may not be scheduled for duty in excess of 18 hours (for domestic operations). If flight attendants are scheduled for more than 14 hours of duty, they must receive an extended rest period, and one to three additional flight attendants must be assigned to duty, depending on the length of the duty period. Also, the new rule allows air carriers to apply the rules governing cockpit crew scheduling to the scheduling of flight attendants.

The commuter airline survey conducted for this study was completed prior to the issuance of the final rule on flight attendant rest requirements and duty limits; consequently, information provided by the participating airlines reflect scheduling

---

<sup>52</sup> Regional Airline Association. 1994 annual report.

<sup>53</sup> The 224 accidents are those for which a factual report has been completed by Safety Board investigators.

policies in effect prior to the issuance of the final rule. The six airlines that employ flight attendants reported that the duty and/or flight schedule limits for flight attendants were the same as those for pilots, except that flight attendants could exceed the limits. At two of the six airlines, flight attendants could exceed scheduling limits as needed by the company; at two other airlines, flight attendants could request additional duty that would cause them to exceed the duty limits; and the remaining two airlines did not specify the conditions under which flight attendant duty limits could be exceeded.

Excessive duty periods for flight attendants, whether requested by flight attendants themselves or required by management, can result in degraded performance due to fatigue. Consequently, the Safety Board is pleased that duty in excess of the limits imposed by the new rule is prohibited.

***Hands-On Emergency Training.***—Flight attendant training should ensure that flight attendants are well trained and skilled in the procedures needed to perform effectively during emergency situations. Under Parts 121 and 135, flight attendants (and cockpit crews) are required to complete training on emergency procedures during both initial and annual recurrent training.

Under Part 135, flight attendants and pilots must perform emergency drills such as emergency evacuations, fire extinguishing, the operation and use of emergency exits, the use of crew and passenger oxygen, ditching (if applicable), the donning and inflation of life vests (if applicable), and the removal and inflation of life rafts (if applicable). These drills are intended to provide crewmembers with the opportunity to practice using emergency equipment and to acquire hands-on experience with opening emergency exits. Part 135 regulations also state that flight attendants and pilots need not perform the drills if the air carrier can demonstrate that the skills can be adequately trained by demonstration (that is, no hands-on use of the emergency equipment). However, some procedures—such as opening exit doors—are difficult to adequately train through demonstration, and the FAA is unlikely to grant an exemption from hands-on performance of those drills. All six airlines that participated in the survey and that employ flight attendants require their flight attendants to practice opening exit doors during initial and recurrent training.

Concern was expressed by some participants at the public forum that crewmembers (both flight attendants and pilots) do not receive sufficient hands-on training to enable them to perform adequately in the event of an emergency. They commented that the FAA allows airlines to substitute demonstrations for participatory drills without showing that there is no degradation in the quality of instruction. In 1992, the Safety Board completed a special investigation of flight attendant training programs at Part 121 airlines.<sup>54</sup> The report concluded that many

---

<sup>54</sup> National Transportation Safety Board. 1992. Flight attendant training and performance during emergency situations. Special Investigative Report NTSB/SIR-92/02. Washington, DC.

airlines do not perform evacuation drills during recurrent training.<sup>55</sup> The investigation also examined the performance of flight attendants during actual emergencies and linked deficiencies in performance to inadequacies in the emergency training received by the flight attendants. The report stated the following:

The Safety Board believes that some flight attendants may not have been given enough information about and/or practice with equipment and situations to master the skills they need in an emergency. Or conversely, they may be given so much information, such as multiple locations of equipment on several types of airplanes, that these locations cannot readily be recalled during an emergency.

As a result of its findings from the special investigation, the Safety Board issued the following recommendation to the FAA:

Require flight attendant hands-on proficiency drills for each type of airplane exit, and ensure that flight attendants are evaluated individually by an instructor and that a record is kept that they have performed and successfully completed such drills. (A-92-70)

In its 1992 response to the recommendation, the FAA indicated that it did not agree with the recommendation and believed that the current requirements concerning flight attendant training were adequate. In January 1993, the Safety Board classified this recommendation, "Open—Unacceptable Response" and asked the FAA to reconsider its position on the issue. The FAA's position remains unchanged; thus, the Safety Board reclassifies Safety Recommendation A-92-70 "Closed—Unacceptable Action."

The Safety Board believes that, whether conducted under Part 121 or Part 135, hands-on emergency drills are a necessary part of the overall training curriculum for all crewmembers, and that substituting visual information and demonstration for actual practice can lead to a degradation in performance during actual emergencies. Such degradation is recognized in flightcrew training, where the need to practice emergency procedures through active participation is the principle that underlies the requirements for recurrent flight training by pilots. Also, because the occasions when flight attendants need to call on emergency training are rare, flight attendants need to be provided with the opportunity to practice the necessary skills more frequently than every 24 months, as is required under Part 121. Therefore, the Safety Board believes that all flight attendants should be required, during recurrent training, to participate in drills that allow them the opportunity to use emergency equipment and to practice procedures under simulated emergency conditions.

---

<sup>55</sup> Under Part 121, air carriers are required to conduct some hands-on drills once every 24 months rather than annually.

**Cockpit/Cabin Crew Resource Management Training.**—Timely, accurate, and effective communication between flight attendants and cockpit crews during an emergency is necessary to ensure the safety of passengers.

In 1994, the Safety Board investigated a nonfatal accident involving a SAAB 340B, operated under Part 121 by Simmons Airlines (as American Eagle).<sup>56</sup> The pilots of the aircraft performed an emergency landing following the in-flight loss of power to both engines. In its investigation, the Safety Board found that, as a result of a breakdown in communications between the flightcrew and the flight attendant, the passengers were not prepared for the emergency landing. Instructions from the cockpit crew intended for the flight attendant were inadvertently broadcast over an air traffic control channel by the first officer and were never received by the flight attendant. Nevertheless, the Safety Board found that there were sufficient cues for the flight attendant to have recognized that the flight was experiencing an emergency, and the attendant should have prepared the passengers for an emergency landing.

The Safety Board believes that effective communications and teamwork between cockpit and cabin crews are necessary, and that combined CRM training for flightcrews and flight attendants can teach the necessary skills for effective teamwork during an emergency. Information gathered during the commuter airline survey revealed that three of the six airlines that employ flight attendants conduct joint cockpit/cabin CRM training. The Safety Board believes that flight attendants and pilots at the other airlines would also benefit from such training.

The Safety Board has previously addressed joint cockpit/cabin CRM training. Most recently, as a result of its 1992 special investigation of flight attendant training, the Safety Board issued the following safety recommendation to the FAA:

Amend 14 CFR Part 121.417 to require evacuation and/or wet ditching drill group exercise during recurrent training. Ensure that all reasonable attempts are made to conduct joint flightcrew/flight attendant drills, especially for crewmembers operating on airplanes with two-pilot cockpit crews. (A-92-74)

In its 1992 response to the recommendation, the FAA indicated that it would ask the ARAC on training and qualifications to examine the possibility of improving training in this area. As a result of the FAA's response, Safety Recommendation A-92-74 was classified "Open—Acceptable Alternate Response."

Information provided to the Safety Board by FAA staff indicates that a proposed revision to flightcrew training rules is expected in the near future from the FAA and will include a requirement for joint CRM training for pilots and flight

<sup>56</sup> National Transportation Safety Board. 1994. Simmons Airlines, d/b/a American Eagle flight 3641, SAAB 340B, N349SB, occurring at False River Air Park, New Roads, Louisiana, February 1, 1994. Aircraft Accident Report NTSB/AAR-94/06. Washington, DC.

attendants. The proposed training requirements will apply to both Parts 121 and 135. The Safety Board acknowledges that the FAA is taking action to address the need for joint CRM training for pilots and flight attendants but is disappointed that considerable time has passed and additional time will elapse for rulemaking before the needed improvements are made in the joint CRM training requirements. Consequently, the Board reclassifies Safety Recommendation A-92-74 "Open—Unacceptable Response."

## Airport Certification

Title 14 CFR Part 139, "Certification and Operations; Land Airports Serving Certain Air Carriers," prescribes regulations governing the certification and operation of land airports that are served by any scheduled or unscheduled passenger air carrier operating aircraft with a seating capacity of more than 30 passengers. The Safety Board is concerned that many community airports served by commuter airlines are not certificated in accordance with Part 139 because of the seating capacity of the aircraft serving those airports. Consequently, passengers flying into and out of those airports may not be provided adequate airport safety or emergency response resources.

In its November 1987 aviation safety report on the exclusion of commuter airports in the FAA Airport Certification Program,<sup>57</sup> the General Accounting Office (GAO) found that:

Airports receiving their only scheduled service from commuter airlines cannot acquire certification regardless of their level of passenger activity because the airport does not meet the participation requirement of receiving service from planes with 31 or more passenger seats. In addition, many currently certified airports no longer meet the participation requirements and could have their certification downgraded or withdrawn.

The program results in a higher level of airport safety by reducing the risk of accidents and enhancing an airport's ability to deal with an accident if one occurs. Participating in the program can increase an airport's capital and operating costs; however, grants authorized by the Airport and Airway Improvement Act can cover most of the capital costs.

Alternative participation requirements could be implemented that would increase the number of certified commuter airports.

---

<sup>57</sup> General Accounting Office. 1987. Commuter airports should participate in the Airport Certification Program. GAO/RCED-8841. Washington, DC.



The GAO concluded, "We believe the best alternative for enhancing airport safety is to extend the participation requirements to include all airports receiving regularly scheduled service," and recommended that the Secretary of Transportation direct the FAA Administrator to do the following:

Change the participation requirements for the airport certification program to require certification for all airports that receive regularly scheduled service. If the Secretary deems it necessary to resolve uncertainty over his authority to certify commuter airports, he should seek specific authority from the Congress.

Develop a new category of certification for low-activity airports that would require full implementation of the risk reduction features of the airport certification program and allow the use of alternatives for CFR [crash-fire-rescue].

In a memorandum dated March 25, 1988, to the Manager, FAA Safety and Compliance Division, the FAA Assistant Chief Counsel, General Legal Services Division, stated:

The statutory authority applicable to the present FAR Part 139 airport certification program appears in Section 612(a) of the Federal Aviation Act (49 U.S.C. 1432(a)). It is limited to "airports that serve any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats".

The memorandum concluded:

A statutory amendment removing the words "designed for more than 30 passenger seats" will be necessary before the certification program becomes applicable to all airports regardless of the size of passenger aircraft using the airport.

As a result of the GAO report and the legal opinion of the FAA legal counsel, the FAA submitted a proposal to the Secretary of Transportation that included a request for FAA authority from Congress to expand 14 CFR Part 139 to include commuter airports serving scheduled air carriers.

The Secretary of Transportation approved a proposal for inclusion in the FAA Reauthorization Proposal for FY 1993-1997, to:

Expand the airports certificated by the FAA to include commuter airports serving scheduled air carriers with aircraft designed for 10 or more seats (adding about 175 airports) because of the safety benefits that accrue from having crash, fire, and rescue equipment.

According to the FAA, legislation on the proposal was submitted by the U.S. Department of Transportation (DOT) to Congress and was introduced in 1992 as one measure of a bill. However, the measure was not enacted.

The FAA estimates that about 175 additional airports would come under the airport certification program if such expanded authority were given. In addition to aircraft rescue and firefighting (ARFF) equipment and improved airport guidance signs, the newly certificated airports for commuter airlines would be required to upgrade in the following areas: (a) airfield inspection procedures; (b) staff training; (c) airfield discrepancy reporting (Notices to Airmen); (d) more stringent airfield pavement maintenance standards; (e) requirements for emergency plans and snow/ice control plans; and (f) improved runway/taxiway safety area criteria. Some of the certification standards contained in Part 139, such as equipment requirements for ARFF, are indexed according to the size and type of aircraft that serve the airport. Thus, the amount of firefighting equipment, for example, required at an airport served by small aircraft is less than the amount required at an airport served by large transport aircraft.

The FAA concluded that the impact on the Airport Improvement Program (AIP) would be minimal even though each airport would be required to purchase ARFF equipment and signs and make other improvements. The new AIP costs were undetermined because the amount or quality of rescue equipment and signs would vary from airport to airport; however, the funds necessary for many of the new requirements could be obtained through AIP funding, with the exception of staffing costs and salaries. Also, the additional FAA airport certification inspection requirements would probably require additional staffing for FAA airport safety and certification specialists.

The Safety Board believes that to enhance the level of airport safety, the FAA should seek legislative action within 6 months to include in the airport certification program all airports served by air carriers that provide scheduled passenger service. Further, following the enactment of such legislation, the FAA should revise and expand 14 CFR 135 to permit scheduled passenger operation only into airports certificated under the standards contained in Part 139, "Certification and Operations: Land Airports Serving Certain Air Carriers."

## Chapter 8

## Aircraft Certification and Equipment Requirements

Dramatic increases have occurred in the number and types of aircraft used in commuter operations since completion of the Safety Board's 1980 study of commuter airline safety. During that time, there have also been substantial changes in the airworthiness standards by which commuter aircraft are certificated and in the equipment requirements for commuter aircraft. Two of the most important changes pertain to requirements that all turbine-powered aircraft with 10 or more passenger seats be equipped with a functioning Ground Proximity Warning System (GPWS) by April 1994, and that all aircraft with 10 or more passenger seats be equipped with Traffic Collision Avoidance System (TCAS) equipment by February 1995. A requirement for GPWS on passenger aircraft had been aggressively pursued by the Safety Board, as evidenced by its inclusion on the Board's "Most Wanted" list of safety improvements.<sup>58</sup> The Safety Board strongly believes that, as a result of this requirement, the number of air carrier accidents involving controlled flight into terrain may be dramatically reduced.

Airplanes used in commuter passenger service are certificated under the airworthiness standards contained in either 14 CFR Part 23 (applicable to normal, utility, acrobatic, and commuter category airplanes) or 14 CFR Part 25 (applicable to transport category airplanes). Regulations concerning commuter aircraft certification establish 20 seats as the breakpoint: aircraft with 19 seats and fewer may be certificated under Part 23 (commuter category), whereas aircraft with 20 seats or more must be certificated under Part 25.<sup>59</sup>

The top passenger aircraft operated by regional and commuter air carriers, as ranked by 1993 fleet block hours and reported by the RAA in its 1994 annual report, are shown in table 8.1. These aircraft account for 66 percent of the current regional aircraft operating fleet and 85 percent of the fleet block operating hours. The table also indicates the Federal standards under which the aircraft were certificated and the Federal regulations under which the aircraft operate.

---

<sup>58</sup> In October 1990, the Safety Board adopted a program to identify the "Most Wanted" safety improvements. The purpose of the Board's "Most Wanted" list, which is drawn up from safety recommendations previously issued, is to bring special emphasis to the safety issues the Board deems most critical.

<sup>59</sup> Because aircraft with 10-19 seats are not required to be certificated under Part 23, they could, theoretically, be certificated under the more stringent requirements of Part 25.

**Table 8.1—Top passenger aircraft operated by regional and commuter air carriers, ranked by 1993 fleet block hours, and regulations in Title 14 Code of Federal Regulations governing certification and operation<sup>a</sup>**

Aircraft (and number of seats)	Number in service	Basis of certification (and year certificated)	Basis of operation
1. Saab 340 (30-37)	212	Part 25 (1984, 1989)	Part 121, Part 135 <sup>b</sup>
2. Embraer 120 (30)	212	Part 25 (1985)	Part 135
3. Aerospatiale ATR-42 (46-50)	107	Part 25 (1985)	Part 121
4. Bombarier Dash 8-100A (37-39) Dash 8-100B	125	Part 25 (1984) Part 25 (1993)	Part 121
5. BAe Jetstream 3101 (19) BAe Jetstream 3201	226	Part 23 (1981) Part 23 Commuter (1988)	Part 135
6. Beech 1900 (19) Beech 1900D	200	Part 23 (1983) Part 23 Commuter (1991)	Part 135
7. Fairchild Metro (19) SA227-CC/DC (19)	171	Part 23 (1981) Part 23 Commuter (1990)	Part 135
8. Shorts 360 (36)	60	Part 25 (1982)	Part 121
9. Aerospatiale ATR-72 (66-69)	29	Part 25 (1989)	Part 121
10. Bombardier Dash 7 (50-54)	30	Part 25 (1977)	Part 121
11. BAe/Avro 146/RJ (88-103)	15	Part 25 (1983)	Part 121
12. Bombardier Twin Otter (20)	61	CAR 3 <sup>c</sup> (1966)	Part 135

Source: Regional Airline Association. 1994. 1994 annual report. Washington, DC.

<sup>a</sup> "Regional" refers to airlines predominantly comprising aircraft fleets with 60 seats or fewer; some of these airlines operate exclusively under Part 121. "Commuter" refers to airlines that provide scheduled passenger service under Part 135; some of these airlines also provide passenger service under Part 121.

<sup>b</sup> The 30-seat Saab 340 may be operated under Part 135.

<sup>c</sup> CAR 3, which contained civil aviation regulations, was the predecessor to Part 23.

Although the number of larger capacity commuter aircraft has increased over the past 14 years, commuter airlines continue to rely on 19-seat aircraft for a major portion of their passenger service. According to information provided in the RAA's 1994 annual report, aircraft with 10-19 seats accounted for 48 percent of the total number of airplanes used in commuter airline passenger service in 1993, airplanes with 1-9 passenger seats accounted for 36 percent of the total number of airplanes, and airplanes with 20 to 30 seats accounted for 17 percent.

## **FAA Activity Concerning Commuter Aircraft Certification Standards in 14 CFR Part 23**

Prior to the Safety Board's 1980 study, the FAA had addressed the certification of small (19-seat maximum) commuter aircraft in rulemaking and issuance of Special Federal Aviation Regulations (SFARs). The SFARs applied special airworthiness conditions to airplanes used in Part 135 operations. In January 1969, the FAA issued SFAR 23 to upgrade the level of airworthiness standards for airplanes of 10 or more passenger seats that were intended for use under Part 135. In June 1970, the FAA issued Appendix A to Part 135, which established additional performance standards for airplanes operated under Part 135 with up to 19 passenger seats. SFAR 41, issued by the FAA in September 1979, incorporated Appendix A of Part 135 and provided alternative type design standards for airplanes that weigh more than 12,500 pounds. Prior to the issuance of SFAR 41, these airplanes had to comply with Part 25 (transport category) standards.

At the time of the 1980 study, the FAA had plans to upgrade the certification requirements for airplanes used in commuter airline operations through the establishment of new certification standards for light transport category airplanes (14 CFR Part 24; Airworthiness Standards: Multi-Engine Light Transport Category Airplanes). Based on a brief review of certification standards for the study, the Board expressed its support for improved commuter aircraft standards and urged the FAA to establish new requirements that would be comparable to those for transport category aircraft in Part 25:

The Safety Board believes that the commitment of the FAA and the industry to a new generation of commuter aircraft which will incorporate increased safety standards should have a positive effect on the safety record and growth of the commuter industry. The Safety Board urges the FAA to expedite the evaluation of Part 24's performance reliability, and equipment requirements for the light transport multi-engine aircraft compared to the same requirements provided by Part 25. Prompt settlement on the final standard for the future generation of

commuter aircraft will allow manufacturers to provide more capable, new equipment on commuter routes as soon as possible.

After a review of the feasibility of a new Part 24 to address light transport commuter aircraft, the FAA withdrew the proposal for the new certification standard "because it was not cost effective."

Although the FAA withdrew the proposal for Part 24, it continued to address certification standards for commuter aircraft used in Part 135 operations, which led to the January 1987 adoption of a commuter category in Part 23.<sup>60</sup> The commuter category (Amendment 23-34) specifically recognizes aircraft intended for commercial passenger operations that fall outside the air transport certification standards of Part 25. A commuter category airplane, as defined by Amendment 23-34, is a propeller-driven, multi-engine airplane with a maximum seating capacity of 19 passengers, and a maximum certificated gross takeoff weight of 19,000 pounds or less.

Amendment 23-34 effectively ended certification and production of SFAR 41 airplanes and increased the level of safety in the following areas: analysis for airframe structural fatigue and damage tolerance; fire protection of passenger aircraft cargo compartments; demonstration of emergency passenger evacuation capability; emergency exit location markings and access to emergency exits; and equipping aircraft with a flight data recorder and cockpit voice recorder. In introductory text to Amendment 34, the FAA stated:

Since 1966, the FAA has been applying various additional airworthiness requirements to the certification of small airplanes, intended for use in air taxi operations, to achieve an acceptable level of safety when the affected airplanes are so utilized. These additional requirements were set forth in special conditions, Special Federal Aviation Regulation (SFAR) No. 23, Part 135, Appendix A, SFAR 41. The SFARs were temporary rules intended only to provide relief to the industry and public from the lack of suitable certification procedures and standards while the FAA developed permanent rules. SFAR 23 ceased to be applicable after July 19, 1970, and SFAR 41 expired on September 13, 1983. This final rule, which adds the new commuter category, will set forth airworthiness requirements in Part 23 for airplanes intended for use in commercial operations. As a result of this action, airplanes certificated in the commuter category will achieve a level of safety requisite for commercial operations.

The FAA has since issued additional amendments to Part 23 to address the following areas: fatigue requirements for structures (Amendment 23-38, October 26, 1989); fuel venting and exhaust emission requirements for turbine engine powered

---

<sup>60</sup> Part 23 also addresses and defines aircraft in three other categories: normal, utility, and acrobatic.

airplanes (23-40, September 10, 1990); and electronic displays (23-41, November 26, 1990).

## **Initiatives Concerning Additional Changes in Part 23 Certification Standards**

Further rulemaking action is being taken and considered that would strengthen other standards in Part 23. In NPRM 93-10, published on July 14, 1993, the FAA proposed additional requirements to Part 23 concerning dynamic seats, fire block seats, and load retention for items of mass in the cabin.

Since the 1980 commuter airline safety study, the FAA established an ARAC to assist in the development and evaluation of rulemaking actions concerning Part 23 certification standards that would improve the level of safety. The ARAC currently has working groups addressing the following areas: flight test, loads and dynamics, general structures, powerplant installation, hydraulic test, systems design and analysis, and electromagnetic effects. The FAA reported during the 1994 public forum that the ARAC is preparing to submit proposals addressing specific areas related to flight test and propulsion, and systems design and analysis.

## **Standardization/Harmonization of Joint Airworthiness Authorities and FAA Part 23 Certification Standards**

The ARAC was also charged with addressing the standardization/harmonization of aircraft certification requirements used by the FAA and the European Joint Airworthiness Authorities (JAA). Comments by the FAA during the public forum indicate that the ARAC has developed and submitted several standardization initiatives to FAA management for rulemaking consideration.

On July 8, 1994, the FAA issued NPRM 94-20; Airframe Proposals Based on European Joint Aviation Requirements Proposals, which includes proposed changes to the airworthiness standards for Part 23. The summary to the NPRM states the following:

This document proposes changes to the airworthiness standards for normal, utility, acrobatic, and commuter category airplanes. These

proposals arise from the joint effort of the FAA and JAA to harmonize the Federal Aviation Regulations (FARs) and the Joint Aviation Requirements (JAR) for airplanes that will be certificated in these categories. The proposed changes would provide nearly uniform airframe airworthiness standards for airplanes certificated in the United States under 14 CFR Part 23 (Part 23) and in the JAA countries under Joint Aviation Requirements 23 (JAR 23) simplifying airworthiness approvals for import and export purposes.

Among rule clarifying changes, the NPRM proposes amending Part 23 commuter category aircraft to require a new Mach number speed margin and a new structural reserve fuel condition, to increase the structural requirement for the vertical tail, and to require new commuter category airplane designs to meet damage tolerant requirements. New commuter category designs would no longer be evaluated to safe-life provisions.

One of the changes in the commuter industry over the past 14 years has been the increased use of Part 25-certificated aircraft. Current trends indicate that the number of these aircraft will continue to increase, and newly designed aircraft with 20 seats or more will continue to be certificated under the more stringent requirements of Part 25, which recognize the size, complexity, and type of aircraft operated.

However, the commuter operating fleet will also continue to use a large number of aircraft with a maximum seating capacity of 19. With the creation of the Part 23 commuter category, the FAA and aviation industry have recognized the need for and have issued aircraft safety standards in several specific areas that have enhanced the level of safety for these commuter category airplanes.



## Chapter 9

# Airline Management Oversight

In its 1980 study, the Safety Board noted the importance of management's role and attitude toward safety, and its oversight responsibilities concerning operations conducted under 14 CFR Part 135:

Since management will implement Part 135 and will oversee the operational, maintenance, and training programs of each airline, management's philosophy toward safety and regulatory compliance is of the utmost importance.

Inadequate management safety philosophy and oversight of operations have been cited as factors in several commuter airline accidents. In its investigation of the Continental Express flight that crashed in 1991 following the loss of the left horizontal stabilizer leading edge,<sup>61</sup> the Safety Board concluded that deficiencies in the maintenance department indicated that the company had not instilled an adequate safety orientation in its maintenance personnel. The Safety Board also cited "the failure of the Continental Express management to ensure compliance with the approved maintenance procedures" as contributing to the cause of the accident.

In its determination of the probable cause of a flight training accident in 1991, the Safety Board found that company management lacked involvement in and oversight of its Beechcraft 1900 flight training program.<sup>62</sup> As a result, the Board issued the following recommendation to the FAA:

Require principal operations inspectors of commuter airlines to verify that appropriate and qualified levels of airline management are actively involved in the airline's flight training programs. (A-93-70)

The FAA agreed with the intent of the recommendation and in its response of September 1, 1993, indicated plans to take action:

The FAA will issue an air carrier operations bulletin...to address this recommendation. The FAA agrees that appropriate and qualified levels of airline management must be involved in flight and ground training programs. However, the quality and sufficiency of training is best

---

<sup>61</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-92/04.

<sup>62</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-93/01/SUM.

evaluated by direct observation of training and testing or checking in progress and by examination of surveillance and investigation reports.

Based on the FAA's response, Safety Recommendation A-93-70 was classified "Open—Acceptable Alternate Response" in December 1993. According to FAA personnel, an ACOB has not yet been issued; consequently, the Safety Board reclassifies the recommendation "Open—Unacceptable Response."

Airline management was also cited in the Safety Board's investigations of the two accidents involving GP Express Airlines, Inc. In the 1992 accident in Anniston, Alabama, the Safety Board cited management's decision to pair a newly hired, inexperienced captain with an inexperienced first officer, and the company's policy of providing only one approach chart for each crew as factors.<sup>63</sup> In the 1993 accident in Shelton, Nebraska, in which two company check airmen attempted an aerobatic maneuver during a check flight, the Board concluded that management personnel had failed "to establish and maintain a commitment to instill professionalism in their pilots consistent with the highest levels of safety necessary for an airline operating scheduled passenger service."<sup>64</sup>

At the 1994 public forum, the chief operating officer of GP Express Airlines, who was hired by the airline 10 days prior to the second accident, reported action taken by the airline following the two accidents. He stated that the airline conducted an extensive internal investigation to identify areas with deficiencies, then established a program of education and two-way communication between management and pilots. The official further stated:

It is my belief that in a regional airline environment, senior management must maintain a continuously active role in all areas within the company, especially as it relates to flight operations and maintenance functions. A program of "visible management" has been used to best accomplish this at GP Express.

In 1989, researchers at Boeing Commercial Airplane Company conducted a study that examined air carrier policies and their relation to accident history.<sup>65</sup> The researchers surveyed a small group of operators that had a fewer-than-expected number of crew-caused accidents in an attempt to identify common characteristics. Among the most important characteristics described in the report was a strong emphasis by management on safety:

---

<sup>63</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-93/03.

<sup>64</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-94/01.

<sup>65</sup> Lautman, L.G.; Gallimore, P.L. 1989. Control of crew-caused accidents. Flight Safety Digest. Flight Safety Foundation. October.

These operators characterize safety as beginning at the top of the organization with a strong emphasis on safety and this permeates the entire operation. Flight operations and training managers recognize their responsibility to flight safety and are dedicated to creating and enforcing safety-oriented policies. The presence or absence of a safety organization did not alter the total involvement of these managers. However, a majority of the operators did maintain an identifiable flight safety focal point. There is an acute awareness of the factors that result in accidents, and management reviews accidents and incidents in their own airline and in other airlines and alters their policies and procedures to best guard against recurrence. There is a method for getting information to the flight crews expeditiously and a policy that encourages confidential feedback from pilots to management. This management attitude, while somewhat difficult to describe, is a dynamic force that sets the stage for standardization and discipline in the cockpit brought about and reinforced by a training program oriented to safety issues.

Other researchers have examined the functions of upper management that can predispose an organization to accidents and have concluded that such functions need to be addressed for meaningful accident investigation and prevention.<sup>66</sup>

## Management Structure and Oversight Responsibilities

Federal regulations in Part 135 set minimum requirements for three commuter air carrier management positions to ensure the safety of operations: director of operations, chief pilot, and director of maintenance (or equivalent positions). Neither the regulations nor the Air Transportation Inspectors Handbook (FAA Order 8400.10) limits the scope or duties of these required management positions. The FAA Administrator may approve deviation from the required positions and/or combine positions if the commuter air carrier shows that it can perform its operations safely.

In the 1980 study, the Safety Board found that lower level management personnel spent 30 to 70 percent of their duty time as line pilots, with the remainder of their time divided among extensive management duties. Functions related to maintaining operational safety often competed for time and resources with other management responsibilities and with line flying.

---

<sup>66</sup> Maurino, D. 1992. Corporate culture imposes significant influence on safety. International Civil Aviation Organization Journal. April.

The Safety Board's survey of commuter air carriers conducted for the present study revealed a wide variation in management structure and responsibility across the airlines, and all 21 air carriers surveyed had their director of operations and chief pilot performing duties necessary for the day-to-day operation of the airline in addition to those listed in the flight operations manuals. For example, most of the chief pilots who were interviewed for the survey reported that they flew the line, at least on a part-time basis, and had managerial duties in other areas, including duties related to pilot training, scheduling flight checks and maintenance, resolving issues among the pilots, updating and distributing manuals, safety meetings, ramp coordination, and promoting operational standardization.

The Safety Board acknowledges that the director of operations and chief pilot should maintain flight currency to be effective in their positions. However, airline managers should be given sufficient time and support to perform their critical tasks related to the company's flight safety program.

Management's role in air carrier safety was also a topic of discussion at the 1994 public forum. Participants commented that management positions of director of operations, chief pilot, and director of maintenance are vital to the safe operation of a commuter airline, and participants expressed concern regarding the multiple responsibilities of the positions. In addition, a representative of a major airline reported that management functions of the commuter airline and how the functions are apportioned are examined during the major airline's audit of its code-sharing partner.<sup>67</sup>

## Overview of Commuter Air Carrier Safety Programs

The Safety Board's site survey asked several questions about commuter airline safety programs. Only 5 of the 21 airlines surveyed (24 percent) had an independent flight safety position in the company's management structure. In each case, the position was filled by an officer who reported directly to senior management (for example, to the director of operations or equivalent). When pilots at the five airlines were asked to whom they would voice a safety concern, most cited the director of operations (or equivalent position) or the chief pilot rather than the flight safety officer. A comment frequently offered by officials from the 16 airlines that did not have an appointed safety officer was, "Everyone is responsible for safety." However, in the Safety Board's experience, when everyone is responsible for safety, sometimes no one is responsible for safety.

---

<sup>67</sup> Audits of commuter air carriers by their code-sharing partners are discussed later in this chapter.

The means through which safety information is communicated to airline personnel was similar across the 21 airlines surveyed. Pilots of most of the airlines report flight safety issues usually by completing a company irregularity report and notifying the chief pilot or director of operations verbally or in writing. Officials at 7 of 20 airlines (35 percent) reported that the company has an active accident prevention program. According to the officials' descriptions, the programs typically include regularly scheduled meetings for pilot groups and other employees combined with the distribution of safety information through the use of bulletin boards, company mail boxes, and facsimile messages to outstations. Officials from 10 of 20 airlines (50 percent) reported having a professional standards committee or designated professional standards representative at the airline to review complaints on safety issues and on other matters filed by pilots and company employees.

During the survey of the 21 airlines, pilots were asked whether they had ever reported a safety concern to someone in management. Of the 55 pilots who responded, 23 (42 percent) reported that they had. When asked whether the safety concern was corrected or resolved, 5 of 20 pilots (25 percent) indicated that the problem was not corrected. The Safety Board notes that three of the five unresolved cases involved the pilot's concern about flying while fatigued. In one case, a pilot complained to his chief pilot that he was tired from continually working 14- to 15-hour days. According to the pilot, the chief pilot responded, "If you don't like it, get another job."<sup>68</sup>

## **Initiatives Taken and Action Needed Concerning Air Carrier Safety Programs**

Regulations contained in Parts 135 and 121 do not require air carriers to establish an independent safety position or department (that is, one with responsibilities limited solely to safety concerns). Because only 5 of the 21 commuter airlines surveyed (24 percent) have an independent safety function, the Safety Board is concerned that airline management may not adequately address safety concerns, particularly where safety enhancements compete with operational concerns and where regulatory compliance is not an issue. The survey results suggest that the person most likely approached by pilots with safety concerns is the chief pilot or director of operations, the persons also responsible for the operation of the flight department. Although these management personnel should be informed and aware of safety concerns, the Safety Board believes that a safety officer can be most effective when functioning independently of the day-to-day management of line operations.

---

<sup>68</sup> Results of survey questions related to pilot self-reports of fatigue are discussed in chapter 3, "Flightcrew Scheduling."

The Safety Board previously addressed the need for an independent safety program at airlines conducting operations under Part 121. As a result of its investigation of an accident involving a major air carrier in 1988,<sup>69</sup> the Board issued the following safety recommendation to the FAA:

Initiate a joint airline industry task force to develop a directed approach to the structure, functions, and responsibilities of airline flight safety programs with the view toward advisory and regulatory provisions for such programs at all Part 121 airlines. (A-89-130)

In response to the recommendation, the FAA Administrator cited the release of an advisory circular (AC 120-56) that provided guidelines for the establishment and use of voluntary disclosure programs at airlines conducting operations under Parts 121 or 135:

On March 27, 1990, I announced a national policy intended to encourage more self-policing by airlines and to give new information about what is happening in the industry. An operator who discovers inadvertent non-compliance must promptly correct it and disclose it to the FAA, as well as take necessary corrective actions satisfactory to the FAA that precludes recurrence of similar non-compliance.

The Safety Board replied to the FAA that the voluntary disclosure programs described in AC 120-56 are concerned with the self-disclosure of instances of regulatory noncompliance, whereas the recommendation sought action to develop safety programs that address "nonregulatory" safety concerns. Because FAA's action did not directly address the recommendation, the Board classified Safety Recommendation A-89-130 "Open—Unacceptable Response."

On October 26, 1992, the FAA issued AC 120-59, "Air Carrier Internal Evaluation Programs," which outlined voluntary means for airlines operating under Parts 121 or 135 to monitor the safety and regulatory compliance of their operations on a continual basis through a process of internal audits and inspections. Participants at the 1994 public forum commented that the FAA-sponsored internal evaluation programs are intended to go beyond the self-disclosure programs described in AC 120-56 in that they address both regulatory noncompliance and nonregulatory concerns (such as company policies and practices). In developing their program, air carriers are encouraged to establish an independent evaluation process that reports directly to senior management, to conduct internal surveillance on a regularly scheduled basis, and to share the findings of the internal evaluation with the FAA principal inspectors.

---

<sup>69</sup> National Transportation Safety Board. 1988. Delta Airlines, Inc., Boeing 727-232, N473DA, Dallas-Fort Worth International Airport, Texas, August 31, 1988. Aircraft Accident Report NTSB/AAR-89/04. Washington, DC.

The Safety Board supports the intent of self-disclosure and internal evaluation programs but is concerned that both programs rely on the voluntary participation of airlines, especially considering the results of the air carrier survey (discussed in the previous section of this chapter), which suggest that commuter carriers generally have not developed safety programs voluntarily that meet the intent of AC 120-59. Further, although the guidelines contained in AC 120-59 recommend that internal evaluation programs include an independent process with direct access to top management, no such process is required.

A mandatory airline safety program would greatly enhance a commuter air carrier's ability to identify and correct safety problems before they lead to an accident. An independent safety function with direct access to upper level management would provide a formal means for communicating safety concerns and for coordinating actions to address those concerns. The Safety Board believes that AC 120-59, "Air Carrier Internal Evaluation Programs," provides a comprehensive framework that includes the necessary elements for an effective safety function. Consequently, the Safety Board believes that the FAA should revise the Federal Aviation Regulations to require that all air carriers operating under Parts 121 and 135 establish a safety function, such as outlined in AC 120-59. The Board also reclassifies Safety Recommendation A-89-130 "Closed—Unacceptable Action/Superseded" by this new recommendation.

## **Oversight of Commuter Airlines By Code-Sharing Partners**

Code-sharing arrangements between commuter airlines and major airlines vary from simply marketing agreements to full ownership of a commuter airline by its code-sharing partner.<sup>70</sup> A commuter airline's association with its code-sharing partner is often reflected by a company name and color scheme that are similar to those of the major airline, ticketing and baggage handling for connecting passengers, integrated listings in published flight schedules, and referral of passengers by major airlines to affiliated commuter airlines. Thus, code-sharing arrangements have created and fostered a public perception that a commuter airline is fully owned by the major airline, and the traveling public holds the major airline accountable for the safe operation of the commuter airline. Therefore, there is an obligation on the part of each code-sharer to act accordingly through establishment of a safety program that incorporates communication and coordination between the major airline and the code-sharing commuter airline to provide the traveling public with a level of safety concern commensurate with the public's expectations.

---

<sup>70</sup> Code-sharing arrangements are defined in chapter 1, "Introduction."



The ability of major airline partners to provide operational support and resources is a key benefit to the commuter airlines in code-sharing arrangements. Participants in the commuter airline survey provided examples of how their arrangement with a major airline partner has positively affected safety at their airline: increased standardization of checklists and operating procedures, development of operating manuals and training curriculum, information on ground handling, access to training facilities, and safety audits and safety advice. Three of the 21 commuter airlines surveyed also reported some negative effects of their code sharing arrangement, including failure of the major airline to share safety and other operational information and technical expertise, and increased costs. Because pressures to maintain on-time performance can also have negative effects on safety, the Safety Board asked survey participants if their major partner imposed minimum performance standards or provided performance incentives for on-time performance and for baggage connections. Of the 13 who responded, 8 (62 percent) reported that their code-sharing arrangement includes performance standards or incentives for on-time performance, and 6 (46 percent) reported that their arrangement includes performance standards or incentives for baggage connections. The officials did not indicate whether these standards or incentives had resulted in pressures to perform or whether they had affected the safety of these operations.

With regard to safety audits by their major partner, 6 of 13 commuter airlines (46 percent) reported having received both a flight operations audit and maintenance operations audit by their major partner. All four commuter airlines that are fully owned by a major partner had received a safety audit from their major partner in both flight operations and maintenance operations; none of the three airlines that are partially owned by their major partner had received any safety audits; and only two of six airlines that have no ownership by their major partner had received a safety audit. In those cases where safety audits have not been conducted, the Safety Board does not know if audits were requested by the major airline and refused, or if safety audits were considered unnecessary by the major partners. Regardless of the reason for no safety audits, the information obtained from the air carrier survey suggests that operational oversight by major code-sharing partners, in the form of safety audits, is more likely when there is full ownership of the commuter airline.

Discussions at the public forum addressed the issue of operational oversight and responsibility by major airlines involved in code-sharing arrangements with commuter airlines. Comments offered by airline officials at the forum were consistent with the result of the airline survey, and participants generally agreed that major airlines with ownership of their code-sharing partners are able to exercise greater control over the operations of the commuter airline. According to a representative from one major airline, the company's experience indicates that the most effective way of ensuring satisfactory control over the maintenance, training, and operations of its code-sharing partners is through ownership of the airlines.

Even though there was agreement among forum participants that ownership by the major partner is not necessary for safe operations and a successful code-sharing arrangement, participants agreed that a major airline has oversight



responsibility for the safety of operations conducted by its code-sharing partner(s). A representative from Northwest Airlines reported that following a 1993 accident involving a code-sharing partner, Express II (operating as Northwest Airlink), the airline had revised its operational standards and policies with regard to its code-sharing partners.<sup>71</sup> The new policy will require all code-sharing affiliates to operate under the standards of Part 121, where possible, and any future contracts will include provisions for audit oversight by Northwest Airlines. The representative also reported that the company would provide operational and training resources to assist its commuter airline affiliates in meeting the new standards.

The Safety Board believes that code-sharing arrangements between major airlines and commuter airlines generally represent a positive development in commercial aviation. These arrangements potentially increase access for commuter airlines to technology and resources, such as training simulators, that otherwise would not be available or that would be cost-prohibitive. The Board recognizes that the safety of commuter air carrier operations does not depend on establishing a code-sharing arrangement, nor does the establishment of a code-sharing arrangement guarantee the highest level of safety necessary for a commuter airline operating passenger service. A commuter airline that combines a corporate philosophy in which safety is paramount with a commitment to provide the necessary resources to achieve the highest level of safety may do so without a code-sharing arrangement.

Nevertheless, the Safety Board believes that a major airline participating in a code-sharing arrangement with a commuter airline has a responsibility for operational oversight of its partner that includes a program of regular safety audits of flight operations, training programs, and maintenance and inspection. Thus, the Safety Board believes that the U.S. Department of Transportation should require U.S. domestic air carriers certificated under 14 CFR Part 121, when involved in a code-sharing arrangement with commuter airlines, to establish a program of operational oversight of their code-sharing partners that (a) includes periodic safety audits of flight operations, training programs, and maintenance and inspection; and (b) emphasizes the exchange of information and resources that will enhance the safety of flight operations.

Considerable time may elapse before such a requirement is adopted and implemented. In the interim, the Safety Board believes that the major airlines should take action to establish such a program of operational oversight. Further, the Board believes that the RAA should encourage its member airlines to assist U.S. domestic air carriers with which they have a code-sharing arrangement to establish a program of operational oversight by the air carrier.

---

<sup>71</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-94/05.

## Chapter 10

# FAA Surveillance

The Safety Board's 1980 study of commuter airline safety included an examination of the role and effectiveness of the FAA with regard to its surveillance of Part 135 operations. At that time, surveillance of commuter airlines and air taxis was performed by inspectors assigned to the FAA's General Aviation District Offices (GADOs). The inspectors were also responsible for surveillance of general aviation operations as well as Part 135 operations.

The findings of that study identified deficiencies in several areas of the FAA's program of Part 135 surveillance, including excessive workload demands placed on GADO inspectors, inadequate staffing levels at district offices, lack of standardization in the interpretation and administration of regulations, and a lack of coordinated communication within the FAA. As a result of the study, the Safety Board issued four recommendations to the FAA that directly addressed the surveillance of commuter airlines:

Establish a separate classification of commuter inspectors to conduct commuter airline surveillance. (A-80-64)

Provide specialized training for inspectors assigned to commuter airlines to ensure that inspectors are qualified in the equipment operated and are knowledgeable regarding commuter airline operations. (A-80-65)

Allocate GADO resources to ensure that all commuter surveillance and general aviation requirements can be accomplished. (A-80-66)

Establish a procedure for distributing surveillance of commuter airline maintenance evenly during all periods when maintenance is performed. (A-80-67)

In response to these recommendations, the FAA established a separate classification for inspectors responsible for the certification and surveillance of commuter airlines that places greater emphasis on experience requirements; initiated specialized training courses for inspectors assigned to commuter airlines; and hired additional inspectors specifically for Part 135 certification and surveillance activities, which provided the FAA with more resources and allowed enhanced surveillance during off-hours when maintenance is performed. As a result of the actions taken by the FAA, Safety Recommendations A-80-64 through A-80-67 were classified, "Closed—Acceptable Action" in 1981.

On October 9, 1986, following investigations of three accidents involving commuter airlines, the Safety Board issued a recommendation letter to the FAA which discussed, among other issues, inadequacies in FAA surveillance. In two cases, the FAA's principal operations inspectors for the air carriers involved had been occupied for several months prior to the accident with preparations for the airlines' acquisition of a new aircraft type.<sup>72</sup> In the other case, the principal operations inspector indicated to Safety Board investigators that the excessive workload from having surveillance responsibility for 20 other certificate holders interfered with his ability to perform effectively his surveillance and inspection tasks on the airline.<sup>73</sup> Although no new recommendations pertaining to oversight and surveillance were issued to the FAA, the Safety Board commented in the letter that circumstances of the three accidents demonstrated a continuation of the same problems concerning surveillance that had been discussed in the 1980 study of commuter airline safety.

## FAA Air Carrier Surveillance Programs

Initial operations certification and continued surveillance of each air carrier is accomplished by the following FAA inspectors: a principal operations inspector (POI), principal maintenance inspector (PMI), and principal avionics inspector (PAI). The principal inspectors are located at the Flight Standards District Office (FSDO) or certificate management office with responsibility for the region in which the air carrier's principal base of operations is located, and the inspectors are assigned to applicants for air carrier operating certificates. During the initial certification process, the principal inspectors are responsible for issuing operation specifications, and reviewing and approving operating and maintenance manuals, required management positions, and training programs. Following issuance of the carrier's operating certificate, the principal inspectors are responsible for day-to-day surveillance of operations. Surveillance is accomplished through performance of various types of inspections, such as ramp inspections, cockpit en route or cabin en route inspections, manuals inspections, and so on. All inspections are to be accomplished with guidance provided by job aides (checklists) that are discussed in the Air Transportation Inspector's Handbook (FAA Order 8400.10).

A principal inspector may be assigned to only one air carrier or to several, depending on the number and types of aircraft in the carrier's fleet. According to current FAA guidelines, a principal inspector is assigned to only one airline if the carrier operates a fleet of 30 turboprop aircraft, a combined total of 30 turboprop and

---

<sup>72</sup> National Transportation Safety Board. Aircraft Accident Reports NTSB/AAR-86/07 and NTSB/AAR-87/02.

<sup>73</sup> National Transportation Safety Board. Aircraft Accident Report NTSB/AAR-86/06.

turbojet aircraft, 20 turbojets (two engines), or 15 turbojets (three or four engines). For air carriers operating fewer aircraft, the FAA uses the total number and types of aircraft in combined fleets to determine the carriers in an inspector's assignment. However, for a principal inspector who is assigned to two or more carriers, the size of the combined fleets is 20 percent less than if assigned to only one carrier. In addition to their air carrier responsibilities, principal inspectors may also have oversight responsibility for several other types of operating certificates (for example, air taxi operations, flight schools, agricultural operations, and external load operations).

A commuter air carrier may have facilities in different cities or States; consequently, its primary base of operations may be in the region of one FSDO, but its maintenance base, and one or more training facilities may be located in the region of another FSDO. Further, airlines that use simulators for pilot training must often send their pilots to training centers that may be several States away from the primary base of operations and the FAA office that manages the air carrier certificate. In such cases, the carrier's principal inspectors often delegate the duties of conducting inspections and surveillance of much of the air carrier's operations and training programs to principal inspectors located at the FSDO(s) near those operations. Results of the Safety Board's commuter airline survey provide an example of the FAA's use of "geographic" inspectors. With regard to pilot training programs, 15 of 20 airlines (75 percent) reported that the airline's program is monitored by FAA geographic inspectors. In each of the five cases in which geographic inspectors are not used, the airline conducts pilot training in either the city containing the airline's primary base of operations or in the city containing the FAA office that holds the air carrier certificate.

The FAA has developed national program guidelines (NPGs) to serve as the basic source of information used in planning the annual surveillance of air carriers. The NPGs are published annually and establish the required number of surveillance inspections for various areas of air carrier operations (for example, flight operations, maintenance facilities, training programs). FAA inspectors record the accomplishment of NPGs and data from their inspections in the Program Tracking and Reporting Subsystem (PTRS), a data base designed for recording and tracking inspection tasks.

In addition to surveillance inspections by principal and geographic inspectors, the FAA may also monitor the performance of selected air carriers through additional means, such as the National Aviation Safety Inspection Program (NASIP) and the Regional Aviation Safety Inspection Program (RASIP). Candidate airlines for these additional inspections are identified, in part, by using performance-related information recorded in PTRS. Other events, such as rapid expansion of an air carrier or financial distress, are also used to identify carriers that warrant additional inspections. These inspections are performed by FAA inspectors from offices or regions outside of the FAA office where the air carrier certificate is held.

The FAA's Commuter Survey Report (COMSUR Report) is an annual, special emphasis survey and analysis program that includes safety comments recorded by inspectors during periods of enhanced surveillance at commuter airlines. The Flight Standards National Field Office (FSNFO) conducts increased surveillance of commuter air carriers during a 2- to 3-month period, and all inspector comments made during this period are entered into the PTRS with a designator code that identifies them as part of the COMSUR initiative. COMSUR Reports and inspector comments are reviewed by FAA staff at the FSNFO, and safety-related comments are identified and distributed to all FSDOs and Flight Standards Regional Offices.

The COMSUR Report is used to maximize FAA's resources (for example, NASIPs and RASIPs) by targeting those resources to particular airlines and problem areas that warrant increased inspection. For example, a disproportionately high number of safety-related comments recorded for a particular airline may prompt the FSNFO to recommend additional inspections of the airline.

The Safety Performance Analysis System (SPAS) is a computer-based tracking and analysis system under development by the FAA that is designed to audit air carrier performance indicators, develop comprehensive profiles of certificate holders and monitor trends, and assist in the enhanced surveillance of air carriers.<sup>74</sup> When fully developed, SPAS will also be used to assist the FAA in the determination of internal staffing needs and training requirements for inspectors.

In addition to the conventional approach of surveillance through inspections, the FAA encourages self-monitoring and self-policing on the part of airlines through the guidelines in Advisory Circular AC 120-59, "Air Carrier Internal Evaluation Programs," and AC 120-56, "Air Carrier Voluntary Disclosure Reporting Procedures."<sup>75</sup> Results from the Safety Board's commuter airline survey suggest that voluntary self-disclosure is widely used. Officials from 16 of 19 airlines (84 percent) reported that they have participated in the FAA's self-disclosure program. The Safety Board notes, however, that the FAA currently does not systematically track information on the prevalence or effectiveness of the internal evaluation program. Because FAA staff were unable to provide the Safety Board with information on the number of airlines with internal evaluation programs, the Board is concerned about the degree to which airlines are using these programs, and how the FAA is using the information from the airlines' programs to assist in its surveillance.

During the public forum, representatives from airlines that have participated in the voluntary disclosure and internal evaluation programs stated that the programs have been extremely successful. They further indicated that the use of these programs had helped their airlines to develop a more effective partnership with

---

<sup>74</sup> The SPAS is also discussed in chapter 6, "Aircraft Maintenance and Inspection." As mentioned in chapter 6, a prototype of SPAS was installed in 1993 at FAA regional offices, and full implementation of SPAS is expected in 1997.

<sup>75</sup> Self-policing programs are discussed in chapter 9, "Airline Management Oversight."

the FAA, and that FAA inspectors had developed a better understanding of the nature of the airline business. The representatives also believed that these programs had greatly improved the FAA's ability to accurately gauge an air carrier's posture with regard to safety and compliance. Public forum participants expressed support for further expansion of the partnership approach to surveillance. In addition to the participants' positive comments about the self-disclosure program, they noted that there were some general misconceptions in industry about the self-disclosure program and that further education about the program needed to be provided to the industry and the FAA inspectors.

## **Results From the Commuter Airline Survey Regarding FAA Surveillance**

Several survey questions asked the airlines about their perceptions of their principal inspectors (POI, PMI, and PAI), and of the FAA. The airlines that participated in the survey were generally pleased with the quality of the relationship between their company and its principal inspectors. Officials were asked to rate the quality of the relationship on a five-point scale from "extremely poor" to "excellent." In only one case was the quality of the relationship rated below neutral. According to the official, the reason for the low rating was because the POI was "totally unknowledgeable and not realistic."

With few exceptions, airline officials believed that their principal inspectors were sufficiently familiar with the Federal regulations that affect the airline's operations. They also reported that their inspectors generally responded to requests in a timely manner and usually provided explanations for required operational changes. Officials from 17 of 18 airlines (94 percent) reported that, overall, they believed the airline was being assisted by the FAA.

Standardization of surveillance was a major concern among survey participants. When asked if they perceive the FAA to be consistent in its administration of the regulations across inspectors, offices, and regions, 15 of 16 airlines (94 percent) responded that they do not, and 11 of 14 airlines (79 percent) did not believe the same standards were applied to other, similar airlines as were applied to their own airline. In all 11 cases the official believed that his or her own airline is being held to a higher standard by the inspectors than are other, similar airlines.

Overall, the survey results suggest that the airlines are generally pleased with the level of assistance provided by the FAA, and believe they have a positive working relationship with their principal inspectors. However, airline officials reported difficulties arising from a lack of uniformity by FAA inspectors and regions in the interpretation and application of regulations to their airline's operational policies.

The Safety Board recognizes the positive initiatives taken by the FAA to increase both the amount and the quality of surveillance conducted at the national level through programs such as NASIP, RASIP, and COMSUR. Nevertheless, comments made to Safety Board staff during the airline surveys, issues raised in discussion during the public forum, and recurrent inadequacies in surveillance revealed in accident investigations point to persistent areas of concern with regard to FAA surveillance: inspector qualifications and training; staffing levels and inspector workload; and standardization of surveillance.

## Inspector Qualifications And Training

Public forum participants and officials of airlines that participated in the Safety Board's survey reported that they remain concerned that much of the surveillance of commuter airlines continues to be conducted by FAA inspectors with little or no air carrier experience and with little or no supervision by someone who does have such experience. Current FAA guidelines only require that air carrier inspectors satisfactorily complete the FAA air carrier indoctrination course.<sup>76</sup> Any additional training requirements are determined by the manager of the FAA office to which the inspector is assigned.

An inspector who is assigned to a particular airline might never have flown any of the aircraft types operated by the airline, served as an air carrier crewmember, or worked as a mechanic at an air carrier prior to the inspector's assignment. Also, the airline might have positions for which the inspector has surveillance/certification responsibility but no previous experience and little formal training (for example, flight dispatchers and flight attendants).

The consensus among airline officials during the site visits by Safety Board staff and at the public forum was that each principal inspector should possess extensive background knowledge of the operations, training programs, maintenance, and avionics areas specific to the air carrier to which the inspector is assigned. In addition, the principal inspectors assigned to commuter airlines would also benefit from indoctrination training at the airline that provides exposure to the company's actual training programs.

According to information presented at the public forum by the Air Line Pilots Association (ALPA), 71 percent of the air carriers that have ALPA representation

---

<sup>76</sup> In its investigation of the December 1, 1993, crash of an Express II airplane in Hibbing, Minnesota, the Safety Board found that the inspector responsible for oversight of Express II's pilot training program had never attended the required air carrier indoctrination course despite having been employed at the FAA for 24 years (Aircraft Accident Report NTSB/AAR-94/05).



operate aircraft for which the FAA certificate-holding office does not provide an inspector who is qualified. Airline officials stated that an inspector who has experience in the type(s) of aircraft operated by the airline is better able to evaluate manuals, procedures, and training programs than an inspector who is not familiar with the aircraft type(s). The airline officials acknowledged that familiarity with the type of aircraft operated by a company is especially critical during the initial air carrier certification process or when the airline is preparing for the acquisition of a new aircraft type because operating procedures and manuals are being developed and approved at these times. Inspector experience in specific aircraft types is not as critical once the initial approval process is completed; however, a commuter airline participant in the public forum described his company's effort to qualify its POI on its aircraft, and indicated that once qualified, the inspector was better able to assist the company.

Airline officials are also concerned that some inspectors who conduct surveillance are not adequately familiar with their company's policies and procedures. They further indicated that it would be beneficial for inspectors to attend the airline's training programs. By doing so, inspectors would gain firsthand knowledge of a company's training programs that could help them evaluate company procedures regarding, for example, whether procedures are being followed during operations, whether airline employees are receiving adequate training in the procedures, or whether the procedures are suitable for the particular operating environment.

## **Staffing Levels And Inspector Workload**

Unless assigned exclusively to one air carrier, a principal inspector continues to be assigned numerous duties pertaining to general aviation. In addition, inspectors are involved in tasks related to keeping the inspector's handbook current and other administrative duties that require several hours per week of their planned surveillance schedule.

A common concern raised by commuter airline officials during the public forum is that inspectors spend too much of their available time doing administrative paperwork and too little time actually doing inspections. An FAA representative at the forum acknowledged the problem and reported on a new FAA initiative that utilizes pen-based computer technology to provide inspectors with data entry tools that can be used in the field. The benefit of this new technology is that it allows inspectors to enter data directly into PTRS during the inspection rather than having to return to the office to record the information.

During interviews for the site surveys, officials of several commuter airlines remarked that principal inspectors should be assigned exclusively, in a manner



comparable to Part 121 inspector assignments. Commuter air carriers who had exclusively assigned principal inspectors believed that FAA surveillance was continuous and thorough. They further indicated that those inspectors were available to facilitate their expansion at times when the company was adding new aircraft.

## **Standardization Of FAA Surveillance**

Participants in the commuter airline survey and public forum were nearly unanimous in expressing concern about a lack of standardization among FAA inspectors in the interpretation and enforcement of regulations. Officials reported that it is not uncommon to receive inconsistent or conflicting inspection reports from geographical inspectors who have little or no familiarization with company procedures approved by the principal inspectors.

An FAA representative at the public forum acknowledged problems concerning standardization in the interpretation and enforcement of regulations from inspector to inspector and stated that the problems are recognized by the FAA. According to the representative, the FAA held a meeting to address communication and coordination problems between certificate management offices and geographic inspection offices. As a result of that meeting, recommendations to improve networking and communications between FSDOs, certificate management offices, and geographic inspection offices were forwarded to the Director of Flight Standards at the FAA for consideration.

## **Action Needed To Enhance Surveillance**

The results of this study indicate that many of the FAA surveillance problems identified in the Safety Board's 1980 study continue to be areas of concern. FAA inspector qualifications and workload, and lack of standardization in the interpretation and enforcement of regulations continue to be recurrent issues addressed in accident investigations, and are concerns that were expressed by airline officials and industry experts during the site visits to commuter airlines and in discussions at the public forum.

Initiatives such as the Air Carrier Internal Evaluation Programs and Air Carrier Voluntary Disclosure Reporting Procedures are positive steps toward enhanced self-policing by air carriers. The Safety Board believes that the use of

internal evaluation programs by the air carriers must be subject to regulatory review and enforcement to be effective. As discussed in chapter 9, the Safety Board believes that the advisory circular on internal evaluation programs (AC 120-59) provides a comprehensive framework from which mandatory safety functions could be developed.

The Safety Board recognizes that the FAA has undertaken new initiatives to better utilize the resources available for surveillance of Part 135 operations. New programs such as COMSUR and SPAS are designed to target resources to air carrier problem areas. The Safety Board supports these initiatives and encourages the FAA to accelerate the development of SPAS.

At the root of efforts toward more effective surveillance is the technical knowledge and experience of FAA inspectors in air carrier operations. Currently, inspector comments recorded on PTRS are the primary sources of information used in deciding where to place surveillance resources. Thus, the effectiveness of surveillance ultimately depends on the ability of the inspectors to thoroughly and accurately assess air carrier operations. The Safety Board is concerned that inspections continue to be conducted by personnel with no experience in air carrier operations or familiarity with the specific aircraft types operated by the air carriers they oversee. The Safety Board believes that the FAA should establish a joint industry/government task force, such as an aviation rulemaking advisory committee (ARAC), comprising representatives from the FAA, air carriers, and aircraft manufacturers to review the qualification standards and training curriculum of air carrier inspectors. To lend expertise regarding the development of curricula, the task force should also include representation from the academic community. The intent of the ARAC should be the development of revisions to the qualifying and training standards for air carrier inspectors that will (a) increase their familiarity with air carrier operations and maintenance in general, as well as the specific operations of the air carriers they inspect, and (b) enhance their knowledge of the Federal regulations and provide for more standardized interpretation and enforcement of regulations.

## Chapter 11

# Aligning Regulations With Operating Characteristics

The Federal regulations that govern the safety of flight represent the minimum acceptable standard of safety by which all airlines must operate. The Safety Board believes that the standards for safety should be based on the characteristics of the flight operations, not the seating capacity of the aircraft, and that passengers on commuter airlines should be afforded the same regulatory safety protections granted to passengers flying on Part 121 airlines. In this regard, the Board believes that the regulations contained in 14 CFR Part 135 have not kept pace with changes in the commuter airline industry. The commuter airline segment of commercial aviation can no longer be viewed as an industry primarily comprising small air carriers that operate small, 10-seat airplanes to provide essential air service to remote communities. Today, many commuter airlines operate extensive route systems, and use highly sophisticated transport category aircraft, the safe operation of which depends upon crewmembers who should be qualified and trained to the same standards as are required of crewmembers who fly Part 121 operations. Further, the proliferation of code-sharing arrangements has given rise to coordinated air service between commuter airlines and major air carriers that should be governed by a single regulatory standard, wherever possible.

However, the Safety Board recognizes that the commuter airline industry is diverse, and that some requirements necessary to improve the standard of safety in one aspect of the industry may be impractical in other aspects. The Board believes that scheduled Part 135 air service that uses high performance, transport category aircraft should be operated under the same regulatory standards that govern the Part 121 air carriers. Consequently, the Safety Board believes that the FAA should revise the Federal Aviation Regulations such that all scheduled passenger service conducted in aircraft with 20 or more passenger seats be conducted according to the provisions of 14 CFR Part 121. Additionally, scheduled passenger service conducted in aircraft with 10 to 19 passenger seats should be conducted in accordance with 14 CFR Part 121, or its functional equivalent, wherever possible. The Board believes that these regulatory changes, in combination with the FAA's anticipated revisions to the flightcrew training requirements that will create a single training standard for flightcrews, will enhance the safety of commuter airline operations to a level that is equivalent to current operations conducted under Part 121.

## Findings

1. The commuter air carrier industry has experienced major growth in passenger traffic and changes in its operating characteristics since 1980. There has been a trend toward operating larger, more sophisticated aircraft, and many carriers have established code-sharing arrangements with major airlines. The regulations in Part 135 have not kept pace with many of the changes in the industry.
2. Part 135 regulations on flight time and crew rest allow air carriers to establish schedules that result in reduced rest, and many commuter airlines routinely take advantage of these reduced rest provisions for scheduling flightcrews rather than using the provisions for the intended purpose of accommodating unforeseen circumstances.
3. Self-reports from the commuter airline pilots surveyed indicate that most have flown while fatigued. The most common reasons given for flying while fatigued were the length of duty days, early shift duty followed by late shift duty, and inadequate rest periods.
4. The practice of scheduling Part 135 pilots for training, check flights, or other nonrevenue flights at the end of a full day of scheduled revenue flying reduces the value of the training and increases the potential for fatigue-related accidents.
5. Pressures on Part 135 pilots to accomplish several tasks—such as obtaining weather information, calculating minimum fuel load, and calculating weight and balance—between flights in shorter periods of time increase the risk of critical mistakes that could jeopardize the safety of flight.
6. Results of the commuter airline survey suggest that many commuter airlines still do not provide formal crew resource management (CRM) training to their flightcrews, and other airlines fail to provide comprehensive training that includes recurrent practice and feedback on the use of CRM skills.
7. About 30 percent of pilots who were surveyed indicated that they did not believe that newly-trained pilots are adequately trained for their duties. These pilots reported that CRM training and initial operating experience (for first officers) would be beneficial.

8. The use of flight simulators enables air carriers to train pilots more effectively on hazardous maneuvers and emergency procedures such as wind shear recovery and low-altitude stall recovery; however, new aircraft continue to be certificated by the Federal Aviation Administration and introduced into revenue service before a training simulator for the aircraft is designed and manufactured.
9. Although the Federal Aviation Administration encourages the use of simulators in flightcrew training through Appendix H to Part 121, there is no counterpart for Part 135. A Part 135 operator is allowed to conduct pilot training in a simulator only if the operator is granted an exemption from applicable Part 135 regulations.
10. Most commuter airlines that were surveyed have a company policy that addresses the pairing of inexperienced crewmembers. The most common policy is a requirement that at least one pilot have a minimum of 100 hours in the aircraft type.
11. Hands-on emergency drills are a necessary part of the flight attendant training curriculum, and substituting visual information and documentation for actual practice can lead to degraded flight attendant performance during actual emergencies.
12. Many community airports served by commuter airlines are not certificated in accordance with the airport certification and operations standards in 14 CFR Part 139; consequently, passengers flying into and out of those airports may not be provided adequate airport safety or emergency response resources.
13. Results of the commuter airline survey and discussion at the public forum on commuter airline safety suggest that substantial improvements have been made that address many of the maintenance problems identified in the Safety Board's 1980 study of commuter airline safety.
14. Results of the commuter airline survey indicate that, consistent with past Safety Board recommendations, Federal Aviation Administration inspections of commuter airline maintenance operations are being accomplished frequently, are often unannounced, and occur during night shifts when maintenance activity is greatest.
15. A mandatory airline safety program would enhance a commuter air carrier's ability to identify and correct safety problems before they lead to an accident. Federal Aviation Administration Advisory Circular 120-59, "Air Carrier Internal Evaluation Programs," provides a comprehensive framework that includes necessary elements for an effective safety function.

16. A major airline participating in a code-sharing arrangement with a commuter airline is perceived by the traveling public to be owner of the commuter airline and accountable for the safety of its operations. The major airline should participate in operational oversight of its commuter partner that includes a program of regular safety audits of flight operations, training programs, maintenance, and inspection.
17. The Federal Aviation Administration (FAA) is not perceived as being consistent in the interpretation and enforcement of regulations across FAA inspectors, offices, and regions by 15 out of 16 airlines in the commuter airline survey (94 percent).
18. Federal Aviation Administration surveillance of commuter airlines is often conducted by inspectors who have neither experience in air carrier operations nor familiarity with the specific aircraft types operated by the air carriers they oversee.
19. Self-policing initiatives such as Air Carrier Internal Evaluation Programs and Air Carrier Voluntary Self-Disclosure Reporting Procedures are positive steps toward improving surveillance. To be fully effective, Internal Evaluation Programs should be mandatory for all air carriers, and the Federal Aviation Administration should systematically track the use of Internal Evaluation Programs and the information they generate to enhance the efficiency of its air carrier surveillance.

# Recommendations

As a result of this safety study, the National Transportation Safety Board issued the following recommendations:

*to the Federal Aviation Administration—*

Revise the Federal Aviation Regulations such that:

- All scheduled passenger service conducted in aircraft with 20 or more passenger seats be conducted in accordance with the provisions of 14 CFR Part 121. (Class II, Priority Action) (A-94-191)
- All scheduled passenger service conducted in aircraft with 10 to 19 passenger seats be conducted in accordance with 14 CFR Part 121, or its functional equivalent, wherever possible. (Class II, Priority Action) (A-94-192)

Require principal operations inspectors to periodically review air carrier flight operations policies and practices concerning pilot tasks performed between flights to ensure that carriers provide pilots with adequate resources (such as time and personnel) to accomplish those tasks. (Class II, Priority Action) (A-94-193)

Revise the Federal Aviation Regulations contained in 14 CFR Part 135 to require that pilot flight time accumulated in all company flying conducted after revenue operations—such as training and check flights, ferry flights and repositioning flights—be included in the crewmember's total flight time accrued during revenue operations. (Class II, Priority Action) (A-94-194)

Revise within 1 year the pilot training requirements for scheduled Part 135 operators such that:

- All pilot training for aircraft with 10 or more passenger seats be conducted in accordance with Subparts N and O of 14 CFR Part 121. (Class II, Priority Action) (A-94-195)
- All pilots are provided mandatory crew resource management training that incorporates the principal components of effective CRM training, as outlined in Advisory Circular AC 120-51A, "Crew Resource Management Training." (Class II, Priority Action) (A-94-196)

- All flightcrew members complete the initial operating experience currently required only of pilots-in-command under Part 135.244. (Class II, Priority Action) (A-94-197)

Issue within 6 months a final rule for 14 CFR Part 142 concerning the certification and operation of training centers. (Class II, Priority Action) (A-94-198)

Revise the certification standards for Part 25 and for Part 23 (commuter category) aircraft to require that a flight simulator, suitable for flightcrew training under Appendix H of Part 121, be available concurrent with the certification of any new aircraft type. (Class II, Priority Action) (A-94-199)

Revise the Federal Aviation Regulations to require all flight attendants to participate, during recurrent training, in emergency drills that allow them the opportunity to use emergency equipment and to practice procedures under simulated emergency conditions. (Class II, Priority Action) (A-94-200)

Revise the Federal Aviation Regulations to require that all air carriers operating under Parts 121 and 135 establish a safety function, such as outlined in Advisory Circular AC 120-59, "Air Carrier Internal Evaluation Programs." (Class II, Priority Action) (A-94-201) (Supersedes A-89-130)

Establish a joint industry/government task force, such as an Aviation Rulemaking Advisory Committee (ARAC), comprising representatives from the FAA, air carriers, aircraft manufacturers, and the academic community to review the qualification standards and training curriculum for air carrier inspectors. The intent of the task force should be revisions to the qualifying and training standards for air carrier inspectors that will (a) increase their familiarity with air carrier operations and maintenance in general, as well as the specific operations of the air carriers they inspect; and (b) enhance their knowledge of the Federal Aviation Regulations and provide for more standardized interpretation and enforcement of the regulations. (Class II, Priority Action) (A-94-202)

Enhance the level of safety at airports served by commuter airlines by:

- Seeking legislative action within 6 months to include in the Airport Certification Program all airports served by air carriers that provide scheduled passenger service. (Class II, Priority Action) (A-94-203)



- Revising and expanding 14 CFR 135, following enactment of the legislative action described in Safety Recommendation A-94-203, to permit scheduled passenger operation only at airports certificated under the standards contained in Part 139, "Certification and Operations: Land Airports Serving Certain Air Carriers." (Class II, Priority Action) (A-94-204)

*to the U.S. Department of Transportation—*

Require U.S. domestic air carriers certificated under 14 CFR Part 121, when involved in a code-sharing arrangement with a commuter airline, to establish a program of operational oversight that (a) includes periodic safety audits of flight operations, training programs, and maintenance and inspection; and (b) emphasizes the exchange of information and resources that will enhance the safety of flight operations. (Class II, Priority Action) (A-94-205)

*to U.S. Domestic Air Carriers: Alaska Airlines, Aloha Airlines, America West Air Lines, American Airlines, American Trans Air, Carnival Air Lines, Continental Airlines, Delta Airlines, Hawaiian Airlines, Markair, Midwest Express Airlines, Northwest Airlines, Southwest Airlines, Tower Air, Trans World Airlines, United Airlines, USAir, and USAir Shuttle—*

Establish a program of operational oversight with commuter airline code-sharing partners that (a) includes periodic safety audits of flight operations, training programs, and maintenance and inspection; and (b) emphasizes the exchange of information and resources that will enhance the safety of flight operation. (Class II, Priority Action) (A-94-206)

*to the Regional Airline Association—*

Encourage member airlines to assist U.S. domestic air carriers with which they have a code-sharing arrangement to establish a program of operational oversight by the air carrier that (a) includes periodic safety audits of the member airlines' flight operations, training programs, and maintenance and inspection; and (b) emphasizes the exchange of information and resources that will enhance the safety of flight. (Class II, Priority Action) (A-94-207)

## **By the National Transportation Safety Board**

**James E. Hall**  
Chairman

**John K. Lauber**  
Member

**John A. Hammerschmidt**  
Member

**Adopted: November 15, 1994**

## **Appendix A**

### **Survey Questions Asked During Site Visits To Commuter Airlines**

## Survey Questions for Commuter Air Carriers

1. In what year was your company's operating certificate issued?
2. Where is your operating certificate held?
3. Who is your current POI (name, FSDO)?
4. Who is your current PMI (name, FSDO)?
5. Who is your current PAI (name, FSDO)?
6. Where is your corporate headquarters?
7. Where are your primary maintenance facilities?
8. Where are your company's pilot training facilities?
9. Does your company operate as:
 

FAR 135 on-demand	<b>yes</b>	<b>no</b>
FAR 135 scheduled air carrier	<b>yes</b>	<b>no</b>
FAR 121 supplemental air carrier	<b>yes</b>	<b>no</b>
FAR 121 domestic air carrier	<b>yes</b>	<b>no</b>
10. What was your total number of passenger emplanements for calendar year 1993?
 

under Part 135 \_\_\_\_\_  
  
 under Part 121 \_\_\_\_\_
11. How many aircraft operations (departures) did you perform in calendar year 1993?
 

under Part 135 \_\_\_\_\_  
  
 under Part 121 \_\_\_\_\_

12. For each type of aircraft, provide the number of pilots, flight instructors, and check airmen (do not include contract instructors):

Aircraft Type	No. of Pilots	No. of Crews	No. of Instructors	No. of Check Airmen

13. For each year from 1989 through 1993, please provide the following information, as of the end of that year:

Item	1989	1990	1991	1992	1993
No. of aircraft operated					
No. of pilots employed					
No. of pilots who left the company					
No. of pilots who upgraded					
No. of mechanics employed					
No. of maintenance inspectors employed					
No. of flight attendants employed					

14. Do you have explicit stabilized approach criteria?

\_\_\_\_\_ **yes**      **What are they?**

\_\_\_\_\_ **no**

15. How many airports do you currently serve with your Part 135 passenger service? \_\_\_\_\_

How many of those airports are not certified under Part 139? \_\_\_\_\_

16. For those airports served that are not certified under Part 139, does your company impose any additional requirements pertaining to Aircraft Rescue and Fire Fighting (ARFF) or Emergency Response Services on the community or airport?

\_\_\_\_\_ **yes**      **Describe:**

\_\_\_\_\_ **no**

17. Describe any differences between your operating procedures into airports that are not certified under Part 139 versus airports that are certified under Part 139:

18. How many airports currently served by your scheduled, Part 135 passenger operations are a nontower environment? \_\_\_\_\_

19. Of the airports with control towers, how many towers close before flights are scheduled to arrive or depart? \_\_\_\_\_

20. How many airports, controlled or uncontrolled, are served only by a nonprecision approach or a precision approach that is not aligned with the primary instrument runway? \_\_\_\_\_

21. How many airports currently served by your scheduled, Part 135 operations require approaches into a nonradar environment or to altitudes below center radar coverage? \_\_\_\_\_

22. Currently, what is your average aircraft stage length for scheduled, Part 135 operations? \_\_\_\_\_ miles

23. How many Part 135 crew domiciles do you currently operate? \_\_\_\_\_

24. Do you currently provide Part 121 dispatch services for your scheduled, Part 135 operations? **yes**      **no**

25. Who routinely obtains weather information for your flightcrews?

Flight followers/dispatch	<b>yes</b>	<b>no</b>
Ramp/ops agents	<b>yes</b>	<b>no</b>
Pilots	<b>yes</b>	<b>no</b>

26. Does your company use "canned" flight plans? **yes**      **no**

27. Who performs weight and balance calculations?

Flight followers/dispatch	yes	no
Ramp/ops agents	yes	no
Pilots	yes	no

28. Does your company provide pilots with:

Minimum fuel load?	yes	no
Maximum fuel load:	yes	no

If yes, whose permission would the pilots need to carry additional fuel?

29. Is there a monthly minimum pay or hourly pay guarantee for pilots? yes no

30. What is the salary range for Captains?

minimum \_\_\_\_\_ to maximum \_\_\_\_\_

31. What is the salary range for First Officers?

minimum \_\_\_\_\_ to maximum \_\_\_\_\_

32. Could any of the following result in a reduction in pay received by the pilots?

Mechanical cancellation	yes	no
Weather cancellation	yes	no
Diversion to alternate airport	yes	no

Explain any yes:

33. Are your pilots represented by a union?

\_\_\_\_\_ yes Which one? \_\_\_\_\_

Is there a current contract with the union? yes no

\_\_\_\_\_ no

34. Of the aircraft you operate, on what types is your Director of Operations rated or captain-qualified? (Also indicate whether he or she is current.)

35. Of the aircraft you operate, on what types is your Chief Pilot rated or captain-qualified? (Also indicate whether he or she is current.)

## Code Sharing

1. Does your commuter airline have a code sharing arrangement with a major (or national) airline? Which airline(s)? What is the nature of that association?
  
2. For how many years has your airline been associated with the major airline partner?  
       \_\_\_\_\_ years
  
3. Does your major airline partner own some or all of your airline?

      \_\_\_\_\_ owns all of the airline (100%)  
       \_\_\_\_\_ owns some of the airline   What percentage? \_\_\_\_\_ %  
       \_\_\_\_\_ owns none of the airline

**If the major airline has partial or total ownership,**

When did that investment occur?    19\_\_\_\_\_

From the standpoint of operational management, did any changes in management personnel result from that investment?   **yes   no**

**If yes, specify:**

4. Does your major airline partner impose minimum performance standards on your airline, or provide performance incentive payments to your airline, for:

On-time performance?	<b>yes</b>	<b>no</b>
Baggage connections?	<b>yes</b>	<b>no</b>

**If yes, explain:**

5. Does your major airline partner impose minimum standards on your airline for:

New-hire pilot qualifications?	<b>yes</b>	<b>no</b>
Captain upgrade qualifications?	<b>yes</b>	<b>no</b>
Use of simulator?	<b>yes</b>	<b>no</b>
CRM training?	<b>yes</b>	<b>no</b>

**If any yes, explain:**



6. Have you ever received a safety audit from your major airline partner?

In flight operations?	yes	no
In maintenance?	yes	no

**If yes, when was the most recent safety audit conducted?**

7. Please give examples of how the arrangement with your major airline partner has positively affected safety at your airline.
8. Do you believe that the arrangement with your major airline partner has resulted in any negative safety effects at your airline? How so?
9. Does your major airline partner give preference to your pilots when it is hiring new flight officers? **yes no**
10. Has its policy with respect to hiring or not hiring your pilots affected:
- |                                  |            |           |
|----------------------------------|------------|-----------|
| Turnover among your pilot group? | <b>yes</b> | <b>no</b> |
| Quality of your pilot group?     | <b>yes</b> | <b>no</b> |
| Pilot morale?                    | <b>yes</b> | <b>no</b> |
- If any yes, explain:**
11. Does your major airline partner give preference to your mechanics/inspectors when it is hiring new mechanics/inspectors? **yes no**

12. Has its policy with respect to hiring or not hiring your mechanics/inspectors affected:

Turnover among your mechanics/inspectors?	yes	no
Quality of your mechanics/inspectors?	yes	no
Mechanic/inspector morale?	yes	no

If any yes, explain:

13. Does your major airline partner give preference to your flight attendants when it is hiring new flight attendants?      yes      no

14. Has its policy with respect to hiring or not hiring your flight attendants affected:

Turnover among your flight attendant group?	yes	no
Quality of your flight attendant group?	yes	no
Flight attendant morale?	yes	no

If any yes, explain:

### Scheduling & Flight/Duty Issues

1. Does your company have a policy about pairing new Captains with new First Officers?

\_\_\_\_\_ yes      What is it?

\_\_\_\_\_ no

Is it ever waived?

\_\_\_\_\_ yes      Under what conditions?

\_\_\_\_\_ no

2. What percentage of your scheduled operations depart after 9 p.m.? \_\_\_\_\_%

3. Are pilot scheduling practices and claims of crew fatigue a subject of discussion between line pilots and management?      yes      no

4. Have you ever modified your flight schedules because of pilot concerns about fatigue?

\_\_\_\_\_ **yes**    **Explain:**

\_\_\_\_\_ **no**

5. Have you ever modified your training schedules because of pilot concerns about fatigue?

\_\_\_\_\_ **yes**    **Explain:**

\_\_\_\_\_ **no**

6. Do you schedule flightcrews for standup (continuous duty) overnights?  
**yes**    **no**

Is a hotel room provided to crews while on duty during standup overnights?  
**yes**    **no**

7. How many times in the past 2 years has a pilot declined a shift or terminated a shift early for reasons of fatigue (not illness)?

What was the company's response?

8. How many times in the past 2 years has a pilot declined a training flight or terminated a training flight early for reasons of fatigue (not illness)?

What was the company's response?

9. How many times in the past 2 years has a pilot declined a check flight or terminated a check flight early for reasons of fatigue (not illness)?

What was the company's response?

10. What is company policy with regard to declining or terminating duty due to fatigue?

Is the policy written?

\_\_\_\_\_ **yes**    **Where:**

\_\_\_\_\_ **no**

11. Does the company place any limitations on the number of hours pilots may work at other employment (including military service)?    **yes**    **no**

If **yes**, what are they, and where is the policy written?

12. Does the company monitor or restrict pilots' military flight time (e.g., military reserve flying) to ensure adequate rest for company flight duty?    **yes**    **no**

13. What is the company's sick leave policy?

14. As a matter of company policy, are the provisions for reduced rest (Part 135.265c in the FARs) used for scheduling pilots?    **yes**    **no**

## **Pilot Training and Qualifications**

### **Company Overview**

1. Does the company have a training department?    **yes**    **no**
2. Describe the structure of the training department:
3. What management position is designated as responsible for flight training?

Who does this person report to?

4. What management position is designated as responsible for flight standards (check rides)?

Who does this person report to?

5. Are there specific program (fleet) managers?    **yes**    **no**
6. Who do company flight instructors report to?
7. Who do company check airmen report to?

### **Company Flight Instructors**

8. Describe company policy on how flight instructors are selected:
9. Are there minimum flight hour requirements to qualify as an instructor with the company (other than FARs)?
- yes**    **What are they?**
- no**
10. Is previous instructing experience required to qualify as an instructor with the company?    **yes**    **no**
11. Do flight instructors also fly the line on a regular basis?    **yes**    **no**
12. Describe the flight instructor training program:

### **Company Check Airmen**

13. Describe company policy on how check airmen are selected:
14. Describe your check airman training program:

**Instructor/Check Airman Standardization**

15. Who is responsible for standardization between instructors and between check airmen?

16. Are standardization meetings regularly held?

\_\_\_\_\_ yes      How often are they held (weekly, monthly, etc.)? \_\_\_\_\_

\_\_\_\_\_ no

\_\_\_\_\_ on an "as needed" basis

Who attends meetings?

Does the FAA participate in meetings?      yes      no

17. Do contents of the meeting include the following:

Type of maneuvers performed?      yes      no

How maneuvers are presented?      yes      no

**Flight Training**

18. How many training hours are programmed for:

Initial training:

\_\_\_\_\_ Ground school

\_\_\_\_\_ Simulator

\_\_\_\_\_ ACFT

\_\_\_\_\_ CRM

Recurrent training:

\_\_\_\_\_ Ground school

\_\_\_\_\_ Simulator (prior to proficiency check)

\_\_\_\_\_ ACFT (prior to proficiency check)

\_\_\_\_\_ CRM

## Upgrade training:

- ☐ Ground school  
☐ Simulator  
☐ ACFT  
☐ CRM

19. Can an instructor authorize additional training without approval from his/her superior, if necessary?      **yes   no**
20. What percentage of new-hires and upgrade pilots require additional training (beyond programmed hours)?
- \_\_\_\_\_ % of new-hires  
       \_\_\_\_\_ % upgrades
21. What percentage of pilots complete checkrides with less than the programmed hours of training?
- \_\_\_\_\_ %
22. Are any policies about duty or flight time restrictions observed when scheduling training flights or checkrides (other than FARs)?      **yes   no**
- If **yes**, what is the policy?
- Is this specified in writing?
- \_\_\_\_\_ **yes   Where?**  
       \_\_\_\_\_ **no**
23. Is training only conducted during pilots' duty days?      **yes   no**
24. Is training ever conducted on pilots' days off duty?      **yes   no**
25. Are pilots paid for training time?      **yes   no**

26. Is flight following provided for training and check flights conducted in airplanes at night? **yes no**

If yes, what type of flight following is used for training and check flights conducted in airplanes at night?

\_\_\_\_\_ Dispatch  
\_\_\_\_\_ Flight following (describe):

If no, is an FAA flight plan filed? **yes no**

27. As a matter of company policy, does the student receive a written evaluation of each training flight (without asking for one)? **yes no**

28. Is there a company pilot who is designated by the FAA to give type ratings?

\_\_\_\_\_ **yes In which aircraft types:**

\_\_\_\_\_ **no**

29. For calendar year 1993, what percentage of check rides were given in the pilot's "grace month"?

\_\_\_\_\_ %

30. Describe the steps that are taken by the company when a pilot receives an unsatisfactory evaluation:

A. How is poor performance or a failed checkride documented (besides form 8410-3)?

B. What is required for a re-check?

C. Who is notified (i.e., Chief Pilot, Dir. of Operations, etc.)?

D. Describe retraining.

E. Is the pilot rechecked only on failed item(s), or is a full checkride given?

\_\_\_\_\_ only rechecked on failed item(s)  
\_\_\_\_\_ full checkride given

31. Is upgrading an "up or out" policy? **yes no**



32. Does the company track (maintain performance records for) individual pilots' failure history during the time they work for the company? **yes** **no**
33. What percentage of pilots in 1993 failed a checkride or received an unsatisfactory rating on their first attempt following:

\_\_\_\_\_ % initial training

\_\_\_\_\_ % upgrade training

\_\_\_\_\_ % recurrent training

\_\_\_\_\_ % transition training

### **Simulator and Aircraft Training**

34. Is any training conducted in a simulator?

\_\_\_\_\_ **yes**      **For which aircraft:**

\_\_\_\_\_ **no**

### **If training is conducted in a simulator:**

35. Whose simulator is used (i.e., company's, Flight Safety's, etc.)?
36. For which aircraft types is a simulator used for initial training? (Indicate what type of simulator is used.)

What percentage of pilots receive initial training in the simulator? \_\_\_\_\_%

37. For which aircraft types is a simulator used for upgrade training? (Indicate what type of simulator is used.)

What percentage of pilots receive upgrade training in the simulator? \_\_\_\_\_%

38. For which aircraft types is a simulator used for recurrent training? (Indicate what type of simulator is used.)

What percentage of pilots receive recurrent training the simulator? \_\_\_\_\_%

39. What maneuvers are trained in the simulator that aren't trained in the aircraft?

40. If simulators are available but are not used, why not? (i.e., cost, convenience, quality of training, etc.)

41. Are any check flights conducted in a simulator?

\_\_\_\_\_ **yes**      **Which aircraft types?**

\_\_\_\_\_ **no**

**If training is conducted in the airplane:**

42. Is all training conducted at night (after revenue operations)?      **yes**      **no**

If **no**, what percentage is conducted at night? \_\_\_\_\_%

43. Are compound emergencies conducted?      **yes**      **no**

44. Is partial panel instrument flying practiced?      **yes**      **no**

**If yes, how is it done:**

- \_\_\_\_\_ pulling circuit breakers
- \_\_\_\_\_ covering the instrument panel
- \_\_\_\_\_ other (specify)

45. Does each pilot in the cockpit have an approach chart?

\_\_\_\_\_ **yes**      **Why? (safety?)**

\_\_\_\_\_ **no**      **Why not?**

46. Describe the curriculum for crewmember emergency training (required under Part 135.331--i.e., emergency equipment and evacuation, first aid, etc.). (Who teaches the training? How is it conducted? etc.)

47. Describe the curriculum for training pilots on deicing procedures.

48. Do ground personnel receive training on deicing procedures?

\_\_\_\_\_ **yes**      **Describe the training:**

\_\_\_\_\_ **no**

**Contract Flight Training**

49. Do you use contract flight training (Flight Safety, Simuflite, etc.)?

\_\_\_\_\_ yes      What company? \_\_\_\_\_

\_\_\_\_\_ no      Why not?

**If contract training is used:**

50. Where is contract training conducted (City, State)?

51. Which types of training do you contract out?

Initial	yes	no
Recurrent	yes	no
Upgrade	yes	no
Transition	yes	no
Instructor/check airman	yes	no

52. Whose instructors are used? Contract or your own instructors?

\_\_\_\_\_ contract training center's instructors  
 \_\_\_\_\_ airline's instructors  
 \_\_\_\_\_ both airline and contract instructors (specify for which types of training each is used):

**If contract instructors are used:**

53. How are contract instructors trained on company flight procedures?

54. Who instructs the contract training instructors on the company's procedures?

55. How does the company oversee the instruction of these procedures?

56. Who pays for new-hire pilot training?

\_\_\_\_\_ pilot  
 \_\_\_\_\_ company  
 \_\_\_\_\_ both

**Explain:**

57. Who pays for new-hire checkrides?

☐ pilot  
☐ company  
☐ both

**Explain:**

58. Who pays for pilot upgrade training: pilot or company?

☐ pilot  
☐ company  
☐ both

**Explain:**

59. Who screens the new-hire pilot candidates that are trained by the contract training company?

☐ airline  
☐ contract training company  
☐ both

**Explain:**

60. Is a background check conducted on new-hire pilot candidates? **yes** **no**

Who conducts it?

What is checked?

61. Who selects new-hire pilot candidates?

62. What percentage of contract-trained new-hires failed to qualify for a position with your company in the past 2 years?

\_\_\_\_\_ %

63. Who from the FAA monitors your contract training?

☐ Airline POI  
☐ Training center POI  
☐ Geographic inspector

64. Who from the airline is responsible for company oversight of contract training?

**Crew Resource Management (CRM)**

65. Does the company provide formal CRM training?

\_\_\_\_\_ **yes**

\_\_\_\_\_ **no**

When is CRM provided?

- \_\_\_\_\_ initial training
- \_\_\_\_\_ upgrade training
- \_\_\_\_\_ transition training
- \_\_\_\_\_ recurrent training

66. Who receives formal CRM training?

New-hires? **yes** **no**

Captain upgrade candidates? **yes** **no**

67. How is training conducted:

Is written information provided? **yes** **no**

Are videotapes shown? **yes** **no**

Are role playing exercises conducted? **yes** **no**

68. What topics are covered in CRM training?

69. How much time is devoted exclusively to CRM instruction? \_\_\_\_\_hrs

70. Is joint CRM training conducted with both cockpit crewmembers and flight attendants? **yes** **no**

71. Is LOFT training conducted? **yes** **no**

If yes, for which types of aircraft?

When is it given:

- \_\_\_\_\_ initial training
- \_\_\_\_\_ upgrade training
- \_\_\_\_\_ transition training
- \_\_\_\_\_ recurrent training

**Safety/Accident Prevention**

72. Does the company have an appointed Flight Safety person?    **yes**    **no**

What is the person's position in the company?

To whom does this person report?

73. Does the company have an appointed Ramp Safety person?    **yes**    **no**

What is the person's position in the company?

To whom does this person report?

74. Who in the company investigates accidents, incidents, deviations, and violations?

75. Does your company have a formal incident reporting system? Describe:

76. Is there an active accident prevention program?

\_\_\_\_\_ **yes**      **Describe:**

\_\_\_\_\_ **no**

77. Is safety information published on a regular schedule?    **yes**    **no**

78. Describe the procedures that pilots use to report "safety of flight" issues:

79. Does the company have a professional standards committee or designated professional standards personnel?    **yes**    **no**

Was it organized by the company or the pilots?

\_\_\_\_\_ **company**

\_\_\_\_\_ **pilots**

\_\_\_\_\_ **both**

Who serves on the committee?

80. Are dispatch or flight following personnel represented on the committee?  
      **yes**    **no**

**Pilot Selection**

81. How are pilots selected for employment?

82. Are there minimum qualifying standards?

\_\_\_\_\_ **yes**      **Specify:**

\_\_\_\_\_ **no**

Are they ever waived? How often? Why?

83. Do you ever assign new-hires directly into the left seat?      **yes**      **no**

84. What percentage of current captains were assigned directly into the left seat?  
\_\_\_\_\_ %

85. What type of background checks are conducted?

86. Are DMV checks made?      **yes**      **no**

87. Are records of accident/incident violations requested from the FAA? **yes** **no**

88. Are professional references requested and verified?      **yes**      **no**

89. What percentage of the replies give information beyond employment dates and position held? *(NOTE: We are asking this question because many former employers will only confirm that the person was employed with them. They will not provide any additional information about the person's performance because of fears that they will be sued.)*  
\_\_\_\_\_ %

90. Are any checks for DUI violations/citations done?

\_\_\_\_\_ **yes**      **Specify:**

\_\_\_\_\_ **no**

## Flight Attendants

1. Do you have flight attendants for your scheduled, Part 135 operations?

\_\_\_\_\_ **yes**    **How many?** \_\_\_\_\_

\_\_\_\_\_ **no**

2. Who in management is responsible for oversight of your flight attendants?

Describe that person's experience and qualifications:

3. Do you have duty and/or flight scheduling limitations for flight attendants?

\_\_\_\_\_ **yes**    **What are they:**

\_\_\_\_\_ **no**

Under what conditions can they be exceeded?

Are they union contractual limits?    **yes**    **no**

4. Do flight attendants perform other functions with the airline when they are not serving as flight attendants (e.g., station agents, reservationists, etc.)?  
**yes**    **no**

If **yes**, what is company policy on duty time limitations?

5. What is the salary range for flight attendants?

minimum \_\_\_\_\_ to maximum \_\_\_\_\_

6. Are your flight attendants represented by a union?

\_\_\_\_\_ **yes**    **Which one?** \_\_\_\_\_

**Is there a current contract with the union?**    **yes**    **no**

\_\_\_\_\_ **no**



### Flight Attendant Training

7. Where is flight attendant training conducted?
8. Do you contract out flight attendant training?  
       \_\_\_\_\_ yes       **With whom?**  
       \_\_\_\_\_ no
9. Who teaches procedures/policies that are specific to your airline?
10. Are the hands-on portions of training conducted in a mock-up or an actual airplane?  
       \_\_\_\_\_ mock-up  
       \_\_\_\_\_ actual airplane
11. Are your flight attendants qualified on all of the aircraft in your fleet (that require a flight attendant)?       **yes    no**

### Maintenance

1. Describe your maintenance management structure.
2. Do you have supervisors for each aircraft type?       **yes    no**  
       **If yes, who do they report to?**
3. What is the salary range for mechanics?  
       minimum \_\_\_\_\_ to maximum \_\_\_\_\_
4. What is the salary range for maintenance inspectors?  
       minimum \_\_\_\_\_ to maximum \_\_\_\_\_

5. Are mechanics/inspectors represented by a union?

\_\_\_\_\_ yes    Which one? \_\_\_\_\_

Is there a current contract with the union? yes no

\_\_\_\_\_ no

6. What percentage of your maintenance is contracted out? \_\_\_\_\_%

What maintenance is done by the company?

What maintenance is contracted out?

7. Do mechanics receive formal training on each type of aircraft you operate?  
yes    no

8. Is all maintenance, other than line maintenance, conducted at night or are aircraft rotated through on a 24-hour basis?

9. How are MELs tracked by your maintenance department?

10. How is outstation maintenance conducted? Is it done by the airline, or is it contracted out?

### FAA Surveillance & Oversight

1. Do you feel that your principal inspectors are sufficiently familiar with the FARs that affect your operation?

POI: yes    no

PMI: yes    no

PAI: yes    no

2. Does your FAA certificate holding office use geographic inspectors from other FAA offices to monitor your pilot training program?    yes    no

3. How many POIs have you had since you have been in business, or in the past 5 years (whichever is shorter)? \_\_\_\_\_

4. How many PAIs have you had since you have been in business, or in the past 5 years (whichever is shorter)? \_\_\_\_\_
5. How many PMIs have you had since you have been in business, or in the past 5 years (whichever is shorter)? \_\_\_\_\_
6. Have you ever requested that your POI be replaced?
- \_\_\_\_\_ **yes**      **Why?**
- \_\_\_\_\_ **no**
7. Have you ever requested that your PMI be replaced?
- \_\_\_\_\_ **yes**      **Why?**
- \_\_\_\_\_ **no**
8. Have you ever requested that your PAI be replaced?
- \_\_\_\_\_ **yes**      **Why?**
- \_\_\_\_\_ **no**
9. Do you believe that you are being assisted by the FAA? Provide examples.
- \_\_\_\_\_ **yes**
- \_\_\_\_\_ **no**
10. Do your principal inspectors usually consider the economic impact of the requirements they make on your company?      **yes**      **no**
11. Does your POI respond to your requests in a timely manner?      **yes**      **no**
12. Does your PMI respond to your requests in a timely manner?      **yes**      **no**
13. Does your PAI respond to your requests in a timely manner?      **yes**      **no**
14. Does your POI provide explanations for required changes to your operation?  
**yes**      **no**
15. Does your PMI provide explanations for required changes to your operation?  
**yes**      **no**
16. Does your PAI provide explanations for required changes to your operation?  
**yes**      **no**

17. How would you rate the relationship between your principal inspectors (POI, PMI, PAI) and your company management personnel?

POI	PMI	PAI
<input type="checkbox"/> extremely poor	<input type="checkbox"/> extremely poor	<input type="checkbox"/> extremely poor
<input type="checkbox"/> bad	<input type="checkbox"/> bad	<input type="checkbox"/> bad
<input type="checkbox"/> neutral	<input type="checkbox"/> neutral	<input type="checkbox"/> neutral
<input type="checkbox"/> good	<input type="checkbox"/> good	<input type="checkbox"/> good
<input type="checkbox"/> excellent	<input type="checkbox"/> excellent	<input type="checkbox"/> excellent

18. Does your company have a self-disclosure program with the FAA? **yes no**

Have you ever used it?

☐ **yes** **Explain:**

☐ **no**

19. Have you found it necessary to contact the FAA regional office concerning FAA matters?

☐ **yes** **Explain:**

☐ **no**

Were you satisfied with their response? **yes no**

20. Have you found it necessary to contact the FAA Washington Headquarters or the FAA SURE hotline concerning FAA matters?

☐ **yes** **Explain:**

☐ **no**

Were you satisfied with their response? **yes no**

21. Do you find the FAA to be consistent in the administration of the regulations and their duties from inspector to inspector, office to office, and region to region?

\_\_\_\_\_ yes

\_\_\_\_\_ no      **Explain:**

22. Do you find that the same standards are applied to all of the air carriers of your type by the FAA?

\_\_\_\_\_ yes

\_\_\_\_\_ no      **Describe some of the differences:**

## Survey Questions for Commuter Air Carrier Pilots

### Demographics

1. How long have you worked for this company?
2. What is your flying background (indicate all that apply)
  - ☐ Military pilot
  - ☐ Civilian *ab initio* training
    - Sponsored or conducted by this airline?    **yes**    **no**
  - ☐ Other civilian training
  - ☐ Flight instructor
  - ☐ Instrument instructor
  - ☐ On demand Part 135 (charter) pilot
  - ☐ Other commuter airline
    - ☐ First officer
    - ☐ Captain
  - ☐ Part 121 air carrier
    - ☐ Flight Engineer/First Officer
    - ☐ Captain
3. To what crew position are you assigned?
  - ☐ Captain
  - ☐ First Officer
4. How long have you been in this position?
5. What aircraft type(s) do you fly for your airline?
6. How many hours do you have in this/these type(s)?
7. How many hours in this/these type(s) as a Captain? A First Officer?

**Flight Operations**

8. Who in management is involved in the day-to-day direction of flight operations?

Describe that involvement.

9. Who performs weight and balance calculations?

☐ Flight followers/dispatch  
☐ Ramp/ops agents  
☐ Pilots

10. For scheduled flights, does your company provide pilots with information on:

Minimum fuel      **yes**    **no**

Maximum fuel      **yes**    **no**

11. Have you ever wanted to bump passengers or baggage to carry more fuel than the minimum?      **yes**    **no**

12. Is there guidance for this in manuals or in other company materials?  
**yes**    **no**

Have you ever done it?    **yes**    **no**

Was there any response from your supervisor? from flight followers? from agents?

☐ **yes**    **Describe:**

☐ **no**

13. If you had a concern about safety at your airline, who in management would you contact?

Have you ever done this?

\_\_\_\_\_ **yes**    **Describe:**

\_\_\_\_\_ **no**

**If yes:**

What was the response you received from this person?

Was your safety concern corrected or resolved? **yes**    **no**

14. Have you ever had an en route or ramp inspection from your POI?  
**yes**    **no**

From another FAA inspector?

\_\_\_\_\_ **yes**    **Who?**

\_\_\_\_\_ **no**

15. Do you see your POI around company premises very often? **yes**    **no**

16. Do you think the POI has an accurate picture of the company's operations?  
**yes**    **no**

Explain.

17. In the past, has the maintenance department generally corrected in a timely manner the aircraft discrepancies that you have identified? **yes**    **no**

Any significant exceptions?

18. When you (or your captain) accept an airplane, are you informed of the maintenance work that has recently been performed on the airplane?

\_\_\_\_\_ **yes**    **How?**

\_\_\_\_\_ **no**



19. Has your airline established procedures for you to use when the airplane breaks down at an outstation? **yes** **no**

What are they? Have you used them? Do they work?

### **Scheduling/Flight Duty-Rest Issues**

20. Does your company have a policy about pairing new Captains and new First Officers?

\_\_\_\_\_ **yes**      **What is it?**

\_\_\_\_\_ **no**

When you were a new Captain or First Officer, did the company follow this policy and refrain from pairing you with another new pilot? **yes** **no**

21. What aspect of the crew schedule, if any, has caused you to fly while fatigued? (indicate all that apply):

- \_\_\_\_\_ None--have not flown while fatigued
- \_\_\_\_\_ Number of days worked per month
- \_\_\_\_\_ Number of flight hours flown per month
- \_\_\_\_\_ Flying late at night
- \_\_\_\_\_ Early shift followed by late shift
- \_\_\_\_\_ Continuous duty overnight
- \_\_\_\_\_ Length of duty days
- \_\_\_\_\_ Length of rest period
- \_\_\_\_\_ Reserve duty
- \_\_\_\_\_ Junior-manning
- \_\_\_\_\_ Unscheduled flight delays
- \_\_\_\_\_ Rescheduling, including addition of more flights to the scheduled day

22. Have you ever wanted to decline or terminate a duty shift early for reasons of fatigue? **yes** **no**

Have you ever done so?

\_\_\_\_\_ **yes**      **What was the company's response?**

\_\_\_\_\_ **no**

- 23 Have you ever wanted to decline or terminate training early for reasons of fatigue? **yes no**

Have you ever done so?

\_\_\_\_\_ **yes**    **What was the company's response?**

\_\_\_\_\_ **no**

24. Have you ever wanted to decline or terminate a checkride early for reasons of fatigue? **yes no**

Have you ever done so?

\_\_\_\_\_ **yes**    **What was the company's response?**

\_\_\_\_\_ **no**

25. What is the company's policy about pilots' declining or terminating duty for reasons of fatigue?

26. Do you commute to your crew domicile from another city?

\_\_\_\_\_ **yes**    **How long is the commute (hours)?**

\_\_\_\_\_ **no**

27. Do you work at any other jobs, besides this one?    **yes no**

**If yes,**

How many hours per week do you work, besides this job?

When do you work? (indicate all that apply)

- \_\_\_\_\_ On days that are free from airline duty  
\_\_\_\_\_ On airline duty days, prior to reporting for duty  
\_\_\_\_\_ On airline duty days, after completing duty

**Training**

28. Who is in charge of training at your airline (title)?

29. At your airline, have you received training from...

Flight instructors who were company employees    **yes**    **no**

Flight instructors who were contractors                      **yes**    **no**

What contractor?

Any comments on the contract training you received?

30. Who paid for your new-hire training?

\_\_\_\_\_ Company

\_\_\_\_\_ You (pilot)

31. Have you been given training in the aircraft (as opposed to the simulator)?  
**yes**    **no**

If yes,

Was all the training prescheduled as a duty day for which you were paid? **yes**    **no**

Did you fly the line on the same day as your training? **yes** **no**

Before or after the training session?                      **yes** **no**

Was most or all of the training done at night?                      **yes** **no**

32. How do you feel about the night-time training you have received (quality; safety)?

33. Was flight-following provided for your night training flights?

\_\_\_\_\_ **yes**    What type? (Dispatch, flight following, etc.):

\_\_\_\_\_ **no**

34. Have you been given training in a simulator? **yes** **no**

**If yes,**

Whose instructors were used?

☐ Company employees  
☐ Contractor employees

Any comments on the quality of training you received?

35. Did the simulator have good fidelity to the airplane?

☐ **yes**

☐ **no**      **Why not?**

36. As a Captain/First Officer, do you think that the newly trained First Officers/Captains you fly with on the line are well-trained for their new duties?

☐ **yes**

☐ **no**      **What additional or different training would prepare them better for the line?**

37. Thinking back on your past ground/flight/simulator training sessions, were you always given the complete course of training, or was ever it shortened? If shortened, why?

### **Checking/flight standards**

38. Who is in charge of checkrides at your airline (title)?

39. At your airline, from whom have you taken checkrides? (indicate all that apply)

☐ Company-employee check airman/designee  
☐ Contractor-employee check airman  
☐ FAA inspector (giving the checkride, not just observing it)

40. Were all the checkrides prescheduled as a duty day? **yes** **no**

41. Did you ever fly the line on the same day as your checkride?

\_\_\_\_\_ **yes**      **Before or after the checkride:**

\_\_\_\_\_ **no**

42. Have you flown on the line with pilots who you feel should not have passed their checkrides?      **yes**      **no**

If **yes**, do you think that your managers know who they are?      **yes**      **no**

Have your managers taken any actions about them, as far as you know?

\_\_\_\_\_ **yes**      **What?**

\_\_\_\_\_ **no**

\_\_\_\_\_ **do not know**

### **CRM training**

43. Have you received CRM training? **yes**      **no**

When did you receive CRM training? (indicate all that apply)

- \_\_\_\_\_ Initial training
- \_\_\_\_\_ Upgrade training
- \_\_\_\_\_ Recurrent training
- \_\_\_\_\_ Transition training
- \_\_\_\_\_ Flight instructor/check airman training

Describe the CRM training that you received:

How much time was devoted exclusively to CRM training?

\_\_\_\_\_ hrs.

44. Did you receive LOFT (line oriented flight training)? **yes**      **no**